Slant/Fin®

INTREPID

3131567
CONFORMS TO UL STD 726
CERTIFIED TO CAN/CSA STD B140.7-05

OIL-FIRED WATER AND STEAM BOILERS/NO. 2 OIL

INSTALLATION AND OPERATING INSTRUCTIONS

READ AND SAVE THESE INSTRUCTIONS FOR REFERENCE

SAFETY WARNING:

KEEP BOILER AREA CLEAR AND FREE FROM COMBUSTIBLE MATERIALS, GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS. FAILURE TO ADHERE TO ABOVE SAFETY WARNING, MAY RESULT IN PERSONAL INJURY OR DEATH AND PROPERTY DAMAGE.

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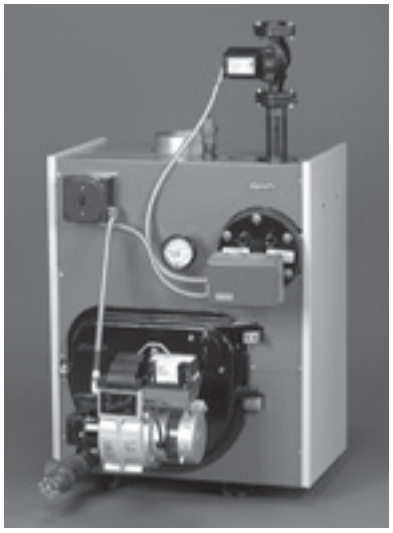
THIS MANUAL MUST BE LEFT WITH OWNER AND SHOULD BE HUNG ON OR ADJACENT TO THE BOILER FOR REFERENCE.



IMPORTANT: The installation of this appliance must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the Installation of Oil Burning Equipment, CSA B139. The installation must also conform to the additional requirements in this Slant/Fin Instruction Manual. Where there is any difference, the more stringent requirement shall govern.

Do not use gasoline crankcase drainings or any oil containing gasoline.

Never burn garbage or paper in this unit, and never leave combustible material around it.

IMPORTANT: This boiler must be installed, serviced and repaired by a trained, experienced, service technician, licensed for the installation and servicing of oil-burning hot-water-heating or steam system equipment or otherwise qualified by the authorities having jurisdiction over the installation.

Heating Contractor	**Boiler Model Number**
Address	**Boiler Serial Number**
Phone Number	**Installation Date**

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Revision L

TAPPINGS AND OPENINGS

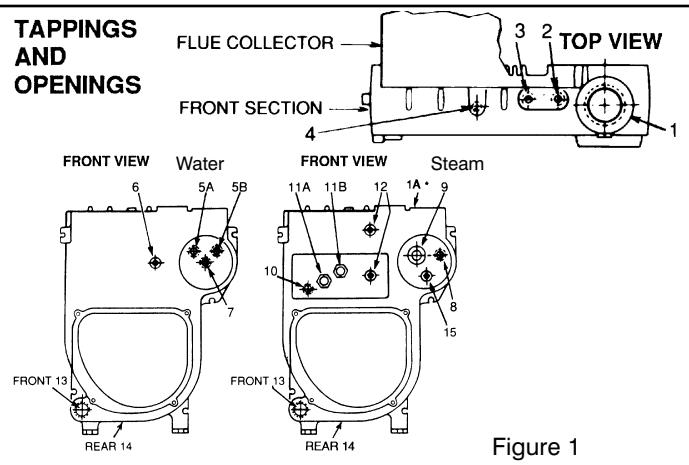

Figure 1

Tapping Location	Steam Boiler	Water Boiler
1	76 mm (3") supply	38 mm (1-1/2") supply
1A	51 mm (2") supply on rear section	—
2	second 6 mm (1/4") siphon & pressure cut-out if required	19 mm (3/4") air vent or expansion tank
3	19 mm (3/4") steam safety valve	19 mm (3/4") water relief valve
4	6 mm (1/4") siphon, pressure gauge & pressure cut-out	—
5A	—	13 mm (1/2") tankless inlet
5B	—	13 mm (1/2") tankless inlet
6	—	6 mm (1/4") pressure temp. gauge
7	—	13 mm (1/2") high limit, hi/lo or combination control
8	19 mm (3/4") alternate electronic low water cut-off	
9	38 mm (1-1/2") skimmer tapping	—
10	13 mm (1/2") low limit for tankless	—
11A	13 mm (1/2") tankless inlet	—
11B	13 mm (1/2") tankless outlet	—
12	13 mm (1/2") steam gauge glass & 67 LWCO	—
13	38 mm (1-1/2") bushed to 19 mm (3/4") for drain cock	38 mm (1-1/2") return & 19 mm (3/4") drain cock
14	38 mm (1-1/2") condensate return	38 mm (1-1/2") alternate return
15	3/4" NPT zone tapping	—

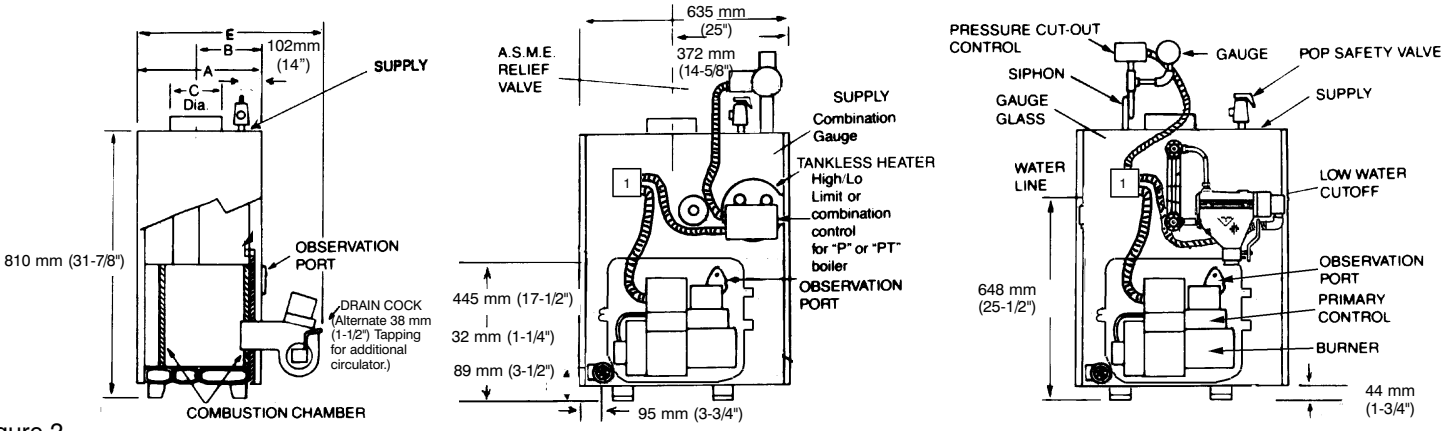

Figure 2

Boiler Model	Boiler Length "A"		Front to Flue "B"		Flue Diameter "C"		Circulator Flange		Overall Length "E"	
	mm	in	mm	in	mm	in	mm	in	mm	in
TR 20	292	11 1/2	210	8 9/32	152¶	6¶	38	1 1/2	616	24 1/4
TR 30	378	14 7/8	255	10 1/32	152¶	6¶	38	1 1/2	702	27 5/8
TR 40	464	18 1/4	298	11 23/32	178	7	38	1 1/2	787	31
TR 50	549	21 5/8	341	13 13/32	203	8	38	1 1/2	873	34 3/8
TR 60	635	25	383	15 3/32	203	8	38	1 1/2	959	37 3/4
TR 70	721	28 3/8	426	16 25/32	229	9			1172	46 1/8"

RATINGS WITH RIELLO BURNER

Boiler Model Number *	OIL INPUT				HEATING CAPACITY OUTPUT				BURNER NET RATINGS						CHIMNEY SIZE				AFUE %		Boiler Sections	TANKLESS HEATER§			
					Water		Steam		Water‡		Steam		Steam		I.D		I.D.ROUND		Water	Steam		Water		Steam	
	ml/s	USGPH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	m^2	Sq.Ft.	mm	in.	mm	in.				ml/s	USGPM	ml/s	USGPM
TR 20	0.79	0.75	31	105	27	91			23	79					203 x 203 x 4.6m	8" x 8" x 15'	127 x 4.6 m	5' x 15'	83.50		2	139	2.20		
TR 30H	1.05	1.00	41	140	35	121			31	105							152 x 4.6m	6" x15'	86.00		3	189	3.00		
TR 30	1.15	1.10	45	154	40	134	40	131	35	117	30	101	39	421					84.85	84.15	3	202	3.20	189	3.00
	1.31	1.25	51	175	45	151			39	131									83.50			214	3.40		
TR 40H	1.58	1.50	62	210	53	182	52	179	46	158	39	134	52	558					86.00	84.00	4	240	3.80	215	3.40
TR 40	1.68	1.60	66	224	58	195	58	195	50	170	43	146	56	608			178 x 4.6m	7" x 15'	84.45	84.80	4	221	3.90	221	3.50
	1.89	1.80	74	252	64	218			56	190									83.33			261	4.15		
TR 50H	2.10	2.00	82	280	71	243	70	239	62	211	52	179	69	746			203 x 4.6m	8" x 15'	86.00	84.00	5	278	4.40	246	3.90
TR 50	2.20	2.10	86	294	76	266	75	255	66	223	56	191	74	796					84.06	83.45	5	277	4.40	252	4.00
	2.47	2.35	96	329	80	272			67	237					203 x 305 x 4.6m	8" x 12" x 15'						296	4.70		
TR 60	2.73	2.60	107	364	88	298	88	298	77	259	66	224	87	933			254 x 4.6m	10" x 15'			6	309	4.90	284	4.50
	3.00	2.85	117	399	97	327			84	284												328	5.20		
TR 70	3.26	3.10	127	434	104	352	105	354	90	306	79	286	103	1108							7	343	5.45	315	5.00
	3.52	3.35	137	469	113	381			98	331												359	5.70		

Note: Standard working pressure 207 kPa (30 psi) water, 103 kPa (15 psi) steam.

* ADD SUFFIX
- X Denotes no circulator and no thermostat
- P Packaged water boiler
- PT Packaged water boiler with tankless heater
- PZ Packaged steam boiler less tankless heater
- PZT Packaged steam boiler with tankless heater

§ Tankless heater rating based on intermittent draw.
§§ Nominal clay tile liner dimensions.

‡ For forced hot water heating systems where the boiler and all piping are located within the area to be heated, the boiler may be selected on the basis of gross output capacity. The net output ratings shown are based on an allowance for piping and pickup of 1.15 (water) or 1.33 (steam). Gross output is divided by the allowance to obtain net rating. The manufacturer should be consulted before selecting a boiler for unusual piping and pickup requirements such as inter mittent system operation, extensive piping, etc.
Note: m^2 of steam is equal to net output (W) divided by 757 W (square feet of steam is equal to net output (BTU) divided by 240 BTUs)

† Ratings apply to the use of light oil at 11,000 W/L (140,000 Btu per gallon), and apply only when burner models listed on pages 15 17 of this manual are used, and are properly adjusted to produce 13% CO_2.

¶ TR 20 Collar is oblong, will fit 152 mm (6") diameter nomi nal connector.

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RATINGS — WITH BECKETT BURNER

Boiler Model Number *	OIL INPUT				GROSS OUTPUT				NET OUTPUT						CHIMNEY SIZE		AFUE %		FLUE SIZE		TANKLESS HEATER §§			
					Water		Steam		Water**		Steam**		Steam		Rectangular I.D. × Height n × n × ft mm × mm × m	Round I.D. × Height in × ft mm × m					Water		Steam	
	mL/s†	USGPH†	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	m^2	Sq. Ft.			Water	Steam	mm	In.	mL/s	USGPM	mL/s	USGPM
TR-30	1.15	1.10	45	154	39	132	39	132	34	117	30	101	39	421	8"×8"×15' 203×203 ×4.6m	6"×15' 152×4.6m	84.8	84.1	152	6	202	3.20	189	3.00
	1.31	1.25	51	175	44	149	–	–	38	131	–	–	–	–			83.5	–	152	6	214	3.40	–	–
TR-40	1.68	1.60	66	224	55	188	55	188	48	170	43	146	56	606		7"×15' 178×4.6m	84.4	83.8	178	7	246	3.90	221	3.50
	1.89	1.80	74	252	63	214	–	–	55	190	–	–	–	–			83.3	–	178	7	261	4.15	–	–
TR-50	2.20	2.10	86	294	72	246	72	246	63	223	56	191	74	796	8"×12"×15' 203×305× 4.6m	8"×15' 203×4.6m	84.0	83.4	203	8	284	4.40	252	4.00
	2.47	2.35	96	329	80	272	–	–	69	237	–	–	–	–			–	–	203	8	296	4.70	–	–

Standard Working Pressure 207 kPa (30 PSI) water, 103 kPa (15 PSI) steam.
All boilers hydrostatically tested—A.S.M.E.

* ADD SUFFIX
X —Denotes no circulator and no thermostat
P —Packaged water boiler has tankless heater
PT —Packaged water boiler with tankless heater
PZ —Packaged steam boiler less tankless heater
PZT —Packaged steam boiler with tankless heater

§§ Tankless heater rating based on intermittent draw.

† Ratings apply to the use of light oil of 11,000 W/L (140,000 Btu per gallon.)

** The Net ratings shown are based on a piping and pick-up allowance of 1.15 for water and 1.333 for steam. For installations having unusual piping and pick-up requirements, additional allowance should be made before selecting the boiler.

Model	P		PT		PZ		PZT	
	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.
TR 30	217	479	221	488	215	473	224	483
TR 40	257	566	261	575	254	559	263	579
TR 50	305	673	309	682	295	651	304	671

INSTALLATION REQUIREMENTS

BOILER LOCATION
Provide a level, solid foundation for the boiler. Location should be near the chimney so that the Flue Pipe Connector or Breeching to the chim ney is short and direct.

A. The foundation must be capable of supporting the weight of the boiler when filled with water:
B. The TR Series Boiler has full wet base sections which surround fire box for maximum heat absorption of burning fuel, and low floor temperature.
C. If boiler is to be located over buried conduit containing electric wires or telephone cables, consult local codes or the National Board of Fire Underwriters for specific requirements.

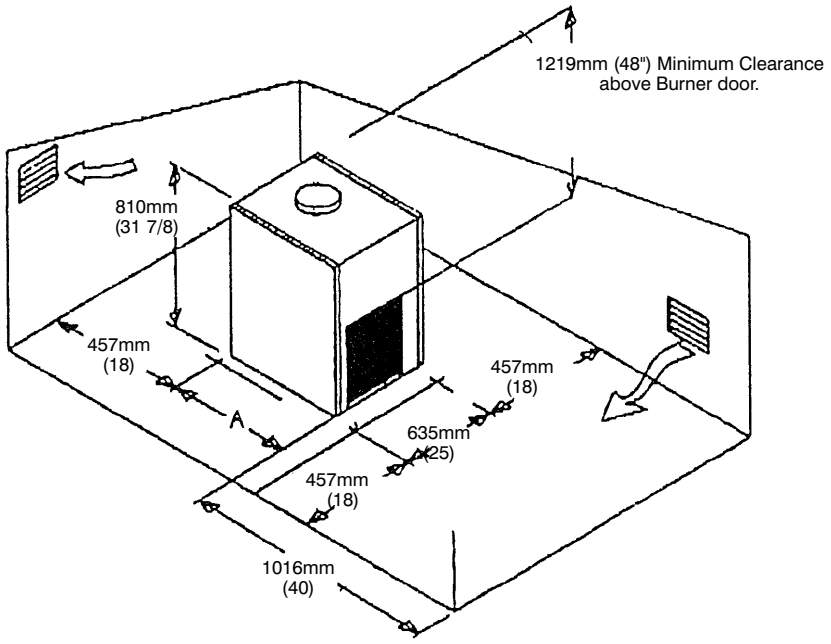
Boiler Size	Approximate Total Weight of Boiler Assembly, filled with water	
	kg	lbs
TR- 20	200	440
TR-30	250	550
TR-40	300	660
TR-50	355	785
TR-60	405	895
TR-70	455	1000

MINIMUM CLEARANCE
Provide accessibility clearance of 610 mm (24") from surfaces requiring servicing (top and front) and 457 mm (18") on any side requiring pas sage. The boiler shall be installed with the following MINIMUM clear ances from combustible materials:
A. CHIMNEY CONNECTOR 457 mm (18")
B. BACK AND LEFT SIDE 152 mm (6") except as limited by 457 mm (18") clearance for chimney connector
C. RIGHT SIDE 152 mm (6") except for allowing for Burner door fully open which requires for:
   Beckett Burner 191 mm (7½")
   Riello E Series Burner 267 mm (10½")
D. FLOOR the boiler is approved for installation on a combustible floor, but subject to any local code requirements. NOT to be installed on or over carpet.

NOTE: As an alternate:
The burner door is removable so that the above service clearances are not mandatory.

CAUTION: NEVER BURN GARBAGE OR PAPER IN THE BOILER
AND NEVER LEAVE COMBUSTIBLE MATERIAL ON OR AROUND IT.

Sufficient space shall be left clear around the boiler. Do not stack items on or box in the appliance within the required clearances to combustibles.



BOiLER MODELS	A mm	A inch
TR20	292	11-1/2
TR30/TRDV30	378	14-7/8
TR40	464	18-1/4
TR50	549	21-5/8
TR60	635	25
TR70	721	28-3/8

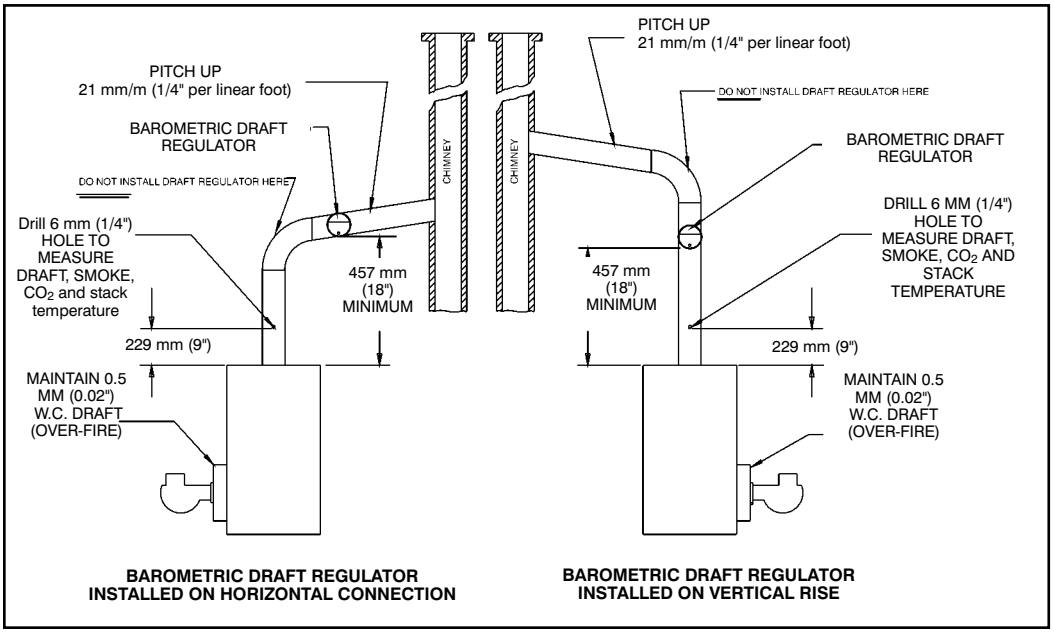

PITCH UP
21 mm/m (1/4" per linear foot)
BAROMETRIC DRAFT REGULATOR
DO NOT INSTALL DRAFT REGULATOR HERE
Drill 6 mm (1/4") HOLE TO MEASURE DRAFT, SMOKE, CO_2 and stack temperature
457 mm (18") MINIMUM
229 mm (9")
MAINTAIN 0.5 MM (0.02") W.C. DRAFT (OVER-FIRE)
CHIMNEY
CHIMNEY
PITCH UP
21 mm/m (1/4" per linear foot)
DO NOT INSTALL DRAFT REGULATOR HERE
BAROMETRIC DRAFT REGULATOR
DRILL 6 MM (1/4") HOLE TO MEASURE DRAFT, SMOKE, CO_2 AND STACK TEMPERATURE
457 mm (18") MINIMUM
229 mm (9")
MAINTAIN 0.5 MM (0.02") W.C. DRAFT (OVER-FIRE)
BAROMETRIC DRAFT REGULATOR INSTALLED ON HORIZONTAL CONNECTION
BAROMETRIC DRAFT REGULATOR INSTALLED ON VERTICAL RISE

Figure 3.
Barometric Draft Regulator Location

CHIMNEY REQUIREMENTS

A. The chimney must be constructed in accordance with all local applicable codes and the National Board of Fire Underwriters. See boiler models and rating table shown on page 2 for chimney sizes.
B. Check chimney condition.
   Existing chimneys and stacks may have deteriorated; without repairs their use would be hazardous. Before connecting to an old chimney or stack:
   1. Clean it.
   2. Inspect it thoroughly.
   3. Remove obstructions.
   4. Replace worn sections of metal stacks.
   5. Seal bad masonry joints.
   6. Repair damaged linings.
C. Where more than one appliance vents into a common chimney, the area of the common Breaching should at least equal the area of the largest appliance flue plus 50% of the additional flue areas.
D. Breaching area must not be reduced at connection into chim ney. Breaching must be inserted into, but not beyond, inside of chimney liner.
E. Chimney height shall extend at least 1 m (3 feet) above where it passes through the roof of the building, and at least 0.5 m (2 feet) above any ridge within 3 m (10 feet) of the chimney.
F. The use of a vent cap, where permitted by code, gives addition al protection against adverse wind conditions and precipitation.
G. Flue Connection: Connect flue pipe between top of boiler and chimney. Horizontal sections of flue pipe must be pitched upward to the chimney at least 21 mm/m (¼" per foot). Flue must be inserted into, but not extend beyond, the inside wall of the chimney flue. Install draft regulator in flue pipe, as shown in figure 3.

BLOCKED VENT SAFETY SWITCH

All Intrepid TR Series boilers must be installed with a Blocked Vent Safety Switch. The Blocked Vent Safety Switch will detect spillage of flue gases due to a blocked vent or inadequate draft.

The Blocked Vent Safety Switch supplied with all Intrepid TR Series boilers must be installed on the barometric damper. Refer to the manufacturers instructions provided with the Blocked Vent Safety Switch for installation, location instructions.

CAUTION: DISCONNECT ELECTRICAL POWER WHEN WIRING.

The Blocked Vent Safety Switch is to be FIELD wired, see wiring diagrams, into the line voltage connection being wired into the junction box, so the Blocked Vent Safety Switch breaks power supply to the boiler shutting it down in the event of a spillage.

IMPORTANT: The Blocked Vent Safety Switch must be wired in accordance with The National Electrical Code, the Installation of Oil Burning Equipment, CSA B139. The installation must also conform to any applicable local codes, the manufacturer's instructions, the requirements of this Slant/Fin manual, and any authority having jurisdiction. Where there is any difference the more stringent requirement shall govern.

Check the operation of the Blocked Vent Safety Switch:
A: Block chimney or vent pipe.
B: Adjust thermostat to call for heat.
C: Allow approximately two minutes for the system to back up and the burner to shut down.
D: Perform steps B and C again.

AIR SUPPLY AND VENTILATION

(see CSA B139, latest edition, Section 7)
Sufficient air for combustion and ventilation in the boiler room must be provided. Failure to do this will result in poor combus tion, heavy sooting and health hazards.

CAUTION: AN OIL-FIRED BOILER MUST BE CONNECTED TO A VENT HAVING SUFFICIENT DRAFT AT ALL TIMES TO ENSURE SAFE AND PROPER OPERATION OF THE BOILER.

Any oil fired boiler must have a steady draft* and an ample supply of combustion air at all times during firing. If air supply or chimney draft* is unreliable, CO_2 and overfire draft* will change unpredictably.

DO NOT vent this boiler to the same chimney flue used by a fireplace or coal or wood burning furnace or boiler. The draft* produced by solid fueled devices varies tremendously between high fire and low fire:

In modern, weather stripped, energy saving buildings or older buildings which have been modified similarly, natural infiltration may not supply enough air for combustion, particularly if other fuel burning appliances, exhaust fans or draft inducers are competing for the same air supply. Fireplaces, other solid fuel burning appliances and exhaust fans consume great quantities of air; if air supply is not ample, such an appliance will create a downdraft in the oil fired boiler flue. This can create a hazardous condition. Flue gases can be sucked out of the chimney through the vent regulator into the living space. DO NOT operate this boiler and a solid fuel burning appliance at the same time, unless the solid fuel burner is provided with its own outside air supply.

See Table 2, “Provisions for Combustion and Ventilation Air Supply” for determining need and method of providing air for combustion and ventilation.

If fly screen must be used over air supply openings, areas calculated should be doubled; the screen should be inspected and cleaned fre quently to maintain free air flow.

Protect air openings against closure by snow, debris, etc. Openings such as doors or windows, if used, must be locked open.

* Draft is negative or suction pressure

TABLE 2: Provisions for Combustion and Ventilation Air Supply. See CSA B139, latest edition, section 7, for more detailed information.

	Boiler Location	Air Supply	Action Required
2.1	Unconfined space	Is there sufficient air for combustion by natural infiltration (see NOTE (1), “Test...” below)?	NONE
2.2	Unconfined space	If there in NOT sufficient air for combustion by natural infiltration due to tight construction or other conditions, then it REQUIRES AIR FROM OUTDOORS. SEE “ACTION REQUIRED” column at right. See Notes (1) and (2) below.	Provide air from outdoors directly through a permanent outside wall opening or openings with a free open area of not less than 645 mm^2/1172W (1 sq. in. per 4000 Btu/hr) of TOTAL input of ALL fuel burning appliances in the building. See Note (1) and (3).
2.3	Confined space	If there is sufficient air for combustion from within building but it comes from outside of the confined space, see “ACTION REQUIRED” column at right. See Note (1) below.	The confined space shall be provided with two permanent air openings, one near the top of the enclosure and one near the bottom. EACH opening shall have a free air opening of not less than 645 mm^2/293 W (1 sq. in. per 1000 Btu/hr.) of TOTAL input of ALL fuel burning appliances within the enclosure. The two openings shall freely communicate with the interior areas of the building which in turn would have to have adequate infiltration of air from outdoors. See Notes (1, 3) and Figure 3a.
2.4	Confined space	If there is NOT sufficient air for combustion due to tight construction or other conditions it REQUIRES AIR FROM OUTDOORS. SEE “ACTION REQUIRED” column at right. See NOTE (2) below.	(a) Air from the outdoors shall be provided to the confined space by two permanent openings, one in or near the top of the enclosure space and one in or near the bottom. The openings shall communicate directly, or by means of ducts, with outdoors or to such spaces (crawl or attic) that freely communicate with outdoors (See figures 3b, 3c and 3d). (b) Where directly communicating with outdoors or by means of vertical ducts, each opening shall have a free area of not less than 645 mm^2/1172 W (1 sq. in. per 4,000 Btu/hr.) or 5964 mm^2/litre/hr (35 sq. in. per gal. per hr.) of total input rating of all appliances in the enclosure. If horizontal ducts are used, each opening shall have a free area of not less than 645 mm^2/586 W (1 sq. in. per 2,000 Btu/hr.) or 11928 mm^2/Litre/hr ((70 sq. in. per gal. per hr.) of total input of all appliances in the confined space. See Figures 3b, 3c and 3d.

(1) Test for sufficient air for combustion by infiltration by running this boiler for 30 minutes under all of the following conditions and at the same time: a) all doors, windows and other like openings must be closed, b) all fuel burning appliances should be FIRING, c) all exhaust fans and clothes dryers turned ON. At the above conditions the CO_2, smoke and draft readings must be normal. (CO_2 between 11% and 13%, smoke between ZERO and a TRACE, draft between 0.5 mm (.02") W.C. and 1.0 mm (.04") W.C. negative pressure.)

(2) Aside from tight construction, some of the conditions that steal air for combustion from a boiler are other fuel burning appliances, exhaust fans and clothes dry ers.

(3) Generally, louvers made of wood have a free open area of 20% and those made of metal have a 60% to 70% free open area. Screens also reduce the open area of the louvers.

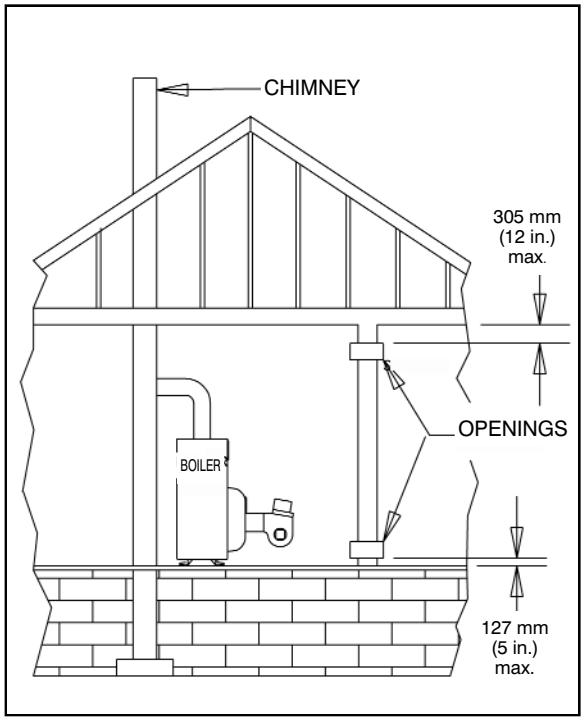


Figure 3a.
Appliances located in confined spaces. Air from inside the building. See Table 2 (2.3).

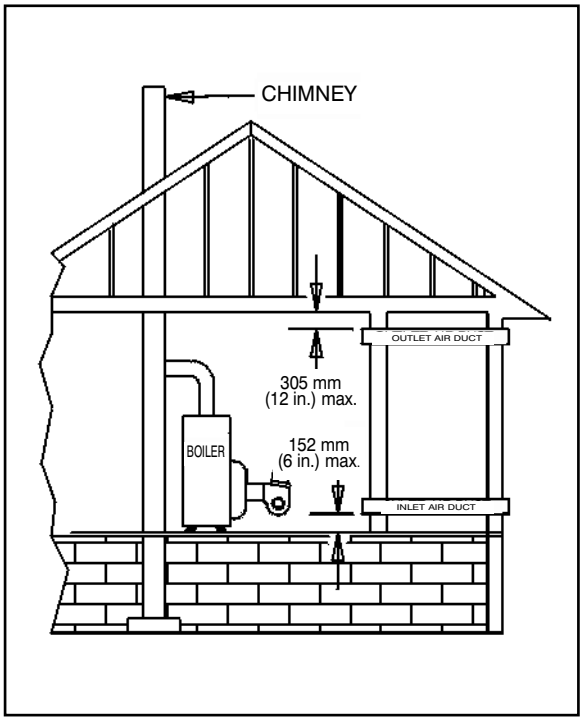


Figure 3b.
Appliances located in confined spaces. Air from outdoors. See Table 2 (2.4).

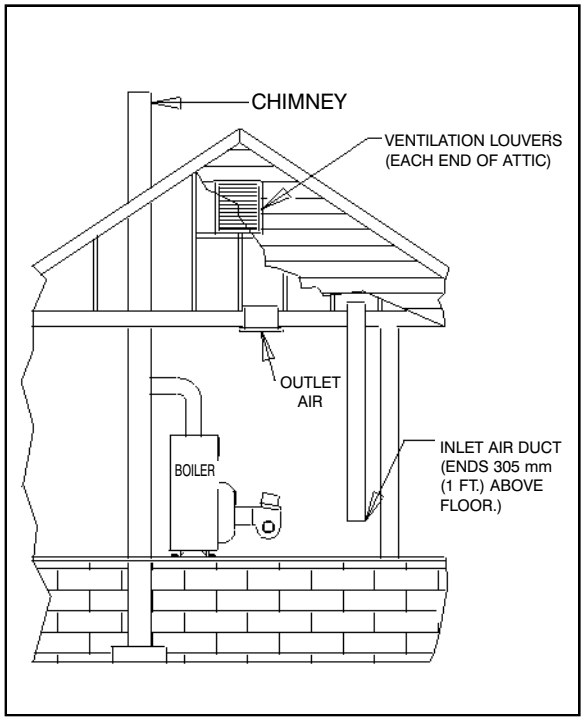


Figure 3c.
Appliances located in confined spaces. Air from outdoors through ventilated attic. See Table 2 (2.4).

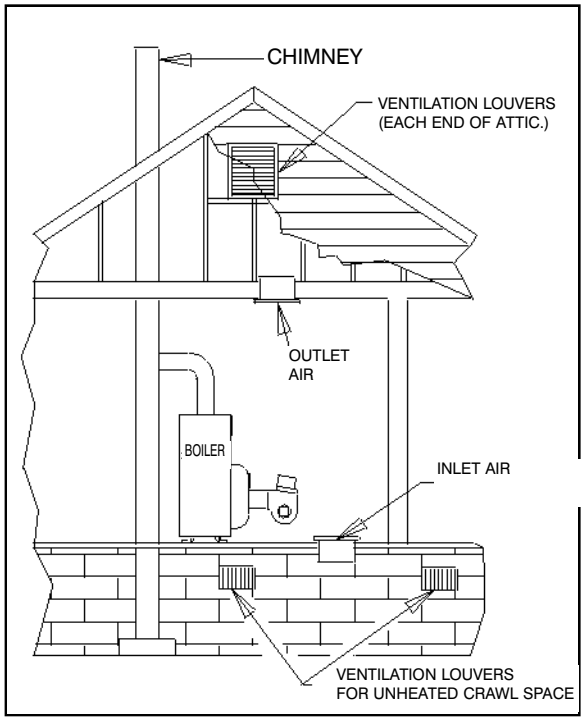


Figure 3d.
Appliances located in confined spaces. All air from outdoors through ventilated crawl space and outlet air to ventilated attic. See Table 2 (2.4).

INSTALLING CONTROLS AND ACCESSORIES ON BOILER UNITS

Notes: Jacket must be installed on boiler units prior to installation of trim.

I. STEAM BOILER TRIM, see page 2 for tapping locations, and figure 4 for illustration of steam boiler.
   A. Steam pressure gauge and pressure cut out, install in tapping no. 4, figure 4.
   B. Gauge glass set use tapping no. 12.
   C. Pop safety valve use tapping no. 3, piped full size to boiler; or pipe full size into a valveless steam header.
   D. Combustion safety control mounted on burner.

II. WATER BOILER TRIM, see page 2 for tapping locations, and figures 1 and 2 for illustration of water boiler.
   A. Pressure temperature altitude gauge use tapping no. 6.
   B. High temperature limit use tapping no. 7.
   C. Operating control (if used) use tapping no. 7.
   D. Water relief valve use tapping no. 3, piped full size to boiler.
   E. Automatic air vent or compression tank tappings if used, install in tapping no. 2.
   F. Combustion safety control mounted on burner.
   G. A low water cut off may be required by local codes. If the boiler is installed above the radiation level, a low water cut off device must be installed in all instances. Do not install an isolation valve between the boiler and the low water cut off.

Escape pipes, drain pipes from relief valves, blow down valves and low water cut-offs must be piped to safe place for discharge according to local codes or the authority having jurisdiction..

PIPING

IMPORTANT: Boilers are to be used with closed system. Any application that uses steam or water from system, causes the introduction of a frequent supply of fresh water into the boiler. This will cause damage to the boiler. Use of heat exchangers will prevent this damage.

PIPING FOR STEAM BOILERS

Provide Header and Hartford Loop as suggested. See figures 4 and 5. Local codes apply.

CLEANING PIPING SYSTEM

A. To clean piping system, open all valves at the heating elements. After getting up a good head of steam, shut the boiler down and allow the condensate to return to the boiler. The condensate will carry the oil film with it. Again blow off the boiler. On extremely fouled systems, it may require several visits over a few days to clean the system.
B. When steam only (no water) is released through the hand valve, the boiler will not surge or flood.
C. See page 10 for complete blowing off instructions.

PIPING FOR WATER UNITS

NOTE: On knocked down boiler only, jacket may be installed after supply and return piping connection, but must be installed prior to adding trim.

I. CIRCULATING SYSTEM
   A. FORCED CIRCULATION hot water heating system: Use the top tapping as supply tapping, and use the front and/or rear bottom tappings for the return.
   B. A FLOW CONTROL VALVE (See figure 6) will prevent gravity circulation and usually is required when tankless heater is installed.

II. AIR CONTROL SYSTEMS
   A. DIAPHRAGM TYPE COMPRESSION TANKS are used to control system pressure in an AIR ELIMINATING SYSTEM: an automatic air vent is used to REMOVE air from the system water. See figure 6. If system pressure needs further control, add an additional tank or install a larger capacity tank. The automatic air vent should be installed in the top of the boiler, as in figure 6.
   B. CONVENTIONAL COMPRESSION TANKS (non diaphragm type) are used to control system pressure in an AIR COLLECTING SYSTEM. Within the system, after initial start up and venting, air is collected in the tank and acts in contact with the water to control pressure. Air is not vented from this system.
   If system pressure needs further control, add another tank in parallel with the original tank or install a large capacity tank. Locate the tank at the inlet end of the pump near the boiler. (See figure 7)

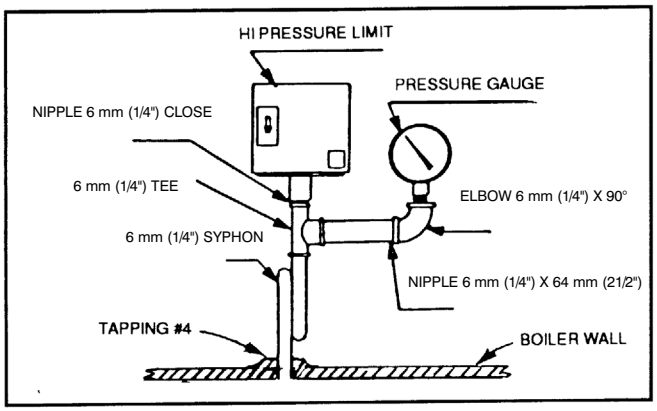
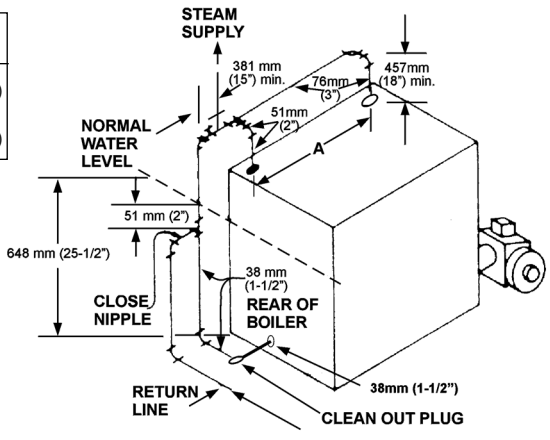
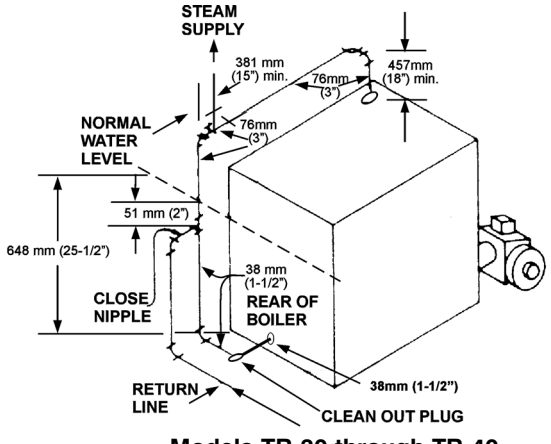

HI PRESSURE LIMIT
PRESSURE GAUGE
NIPPLE 6 mm (1/4") CLOSE
6 mm (1/4") TEE
ELBOW 6 mm (1/4") X 90°
6 mm (1/4") SYPHON
NIPPLE 6 mm (1/4") X 64 mm (21/2")
TAPPING #4
BOILER WALL

Figure 4.

Boiler Size	A Dim.
TR-50	402 mm (15-27/32")
TR-60	488 mm (19-7/32")
TR-70	574 mm (22-19/32")



Models TR-50 through TR-70



Models TR-30 through TR-40

Figure 5

C. HOT WATER RADIATION VENTING Manual air vents should be installed at the top of all "drops"(where piping goes downward). Air must be vented or purged from all zone lines to permit proper system heating.
D. PUMP LOCATION Locating low head pump(s) on return to boil er is only acceptable in residences of one or two stories. (See figure 6) The pump location shown in figure 7 is required in large, multi story building installations, especially when high head pumps are used and is also recommended for all applications.
E. A conventional compression tank may be connected to the 19 mm (¾") tapping as shown in figure 7.

IMPORTANT: Hot water heating systems containing high water volume, such as would occur with cast iron radiation, require special care with air elimination. The circulator pump should be located on the boiler supply pipe and the expansion tank and air scoop should be located near the pump suction. (See Figure 6, Alternate Pump Location.)

PIPING TANKLESS HEATER (if used)

I. Heater capacities are listed on Page 2.
II. Pipe the built in tankless heater using the inlet and outlet tappings indicated on the heater (figure 8).
A. Tempering valve (illustrated, but not furnished) is suggested to provide more volume of temperate water to kitchen and bath.
B. High temperature water, for dishwasher and laundry, may be piped direct.
C. A flow control valve should be used to control the rate of flow of water through the coil, otherwise the heating capacity of the coil will be exceeded. To insure sufficient hot water, the flow rate through the coil should be limited to a maximum shown for inter mittent draw in the ratings table on page 2.

RADIANT FLOOR, LOW WATER TEMPERATURE AND LARGE WATER VOLUME SYSTEMS

A boiler by-pass loop, three way valve arrangement, primary secondary pumping (with a boiler loop) or other acceptable method, must be used to provide a minimum 130˚ return water temperature to the boiler. This will prevent condensation on the cast-iron sections that can result in poor combustion and damage to the boiler.

INSTALLING THE BURNER

See Burner Data, pages 12 to 14, and Burner Manual supplied with burner. If burner is not mounted as received, mount to boiler, placing flange over mounting studs. Use gasket between flange and boiler. Distance between flange and nose of burner (insertion depth) must be as indicated on page 14, (fig. 14).

CAUTION: DO NOT USE GASOLINE, CRANKASE DRAININGS OR ANY OIL CONTAINING GASOLINE.

OIL SUPPLY PIPING

Install the oil tank or tanks and piping from tank to burner. Follow local codes and practices, CSA B139 and the instruction sheet attached to the oil burner pump. A one pipe system should be used for gravity fed fuel systems and for lift systems, where the total lift is less than 2.5 m (8 feet). Where the total lift is greater than 2.5 m (8 feet), a two pipe system must be used. In some instances, local codes may require a two pipe system for below grade fuel oil tanks. Be sure to set up the fuel oil pump for the piping system used; follow the instructions attached to the pump. Be sure to include a good quality, low pressure drop fuel oil filter in the supply line from the tank. This is necessary, especially at low fuel oil flow rates (small nozzle sizes), to prevent nozzle plugging. See Slant/Fin publication on one pipe and two pipe fuel oil systems.

WIRING THE BOILER

A. The wiring diagrams for the burner and boiler are enclosed separately.
B. 24 volt control wiring should be approved Safety Circuit wire, protected as needed.
C. Power supply wiring to the burner must be 14 gauge or heavier, as required, and should have a properly fused disconnect switch. 120 volt wiring to pumps and safety controls must also be 14 gauge or heavier. Wire must be enclosed in approved conduit.
D. All wiring must be installed in compliance with the National Electric Code, or any local or insurance codes having jurisdiction.
E. Wiring to the boiler must come through an emergency power isola tion switch with a clearly marked red switch plate. This switch should be located so that it is apparent to the homeowner when entering the basement or boiler room. The homeowner should be made familiar with operating the switch (toggle) to provide or stop power to the boiler

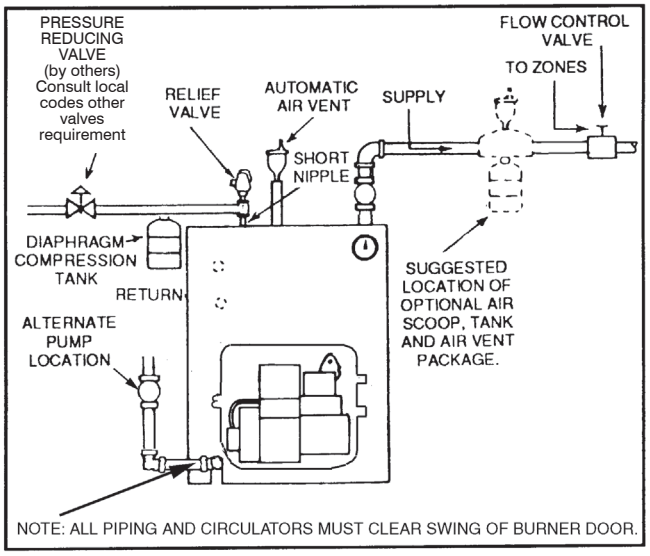

PRESSURE REDUCING VALVE (by others) Consult local codes other valves requirement
RELIEF VALVE
AUTOMATIC AIR VENT
SUPPLY
FLOW CONTROL VALVE
TO ZONES
SHORT NIPPLE
DIAPHRAGM COMPRESSION TANK
RETURN
ALTERNATE PUMP LOCATION
SUGGESTED LOCATION OF OPTIONAL AIR SCOOP, TANK AND AIR VENT PACKAGE.
NOTE: ALL PIPING AND CIRCULATORS MUST CLEAR SWING OF BURNER DOOR.

Figure 6. Air Eliminating System

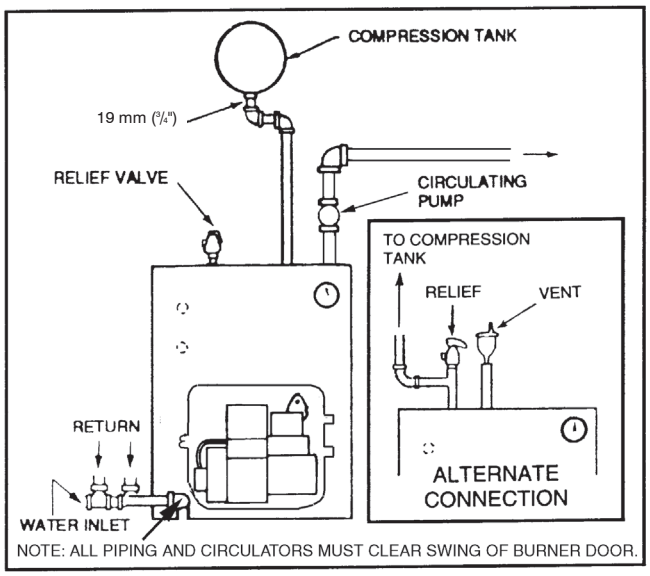


Figure 7. Air Collecting System

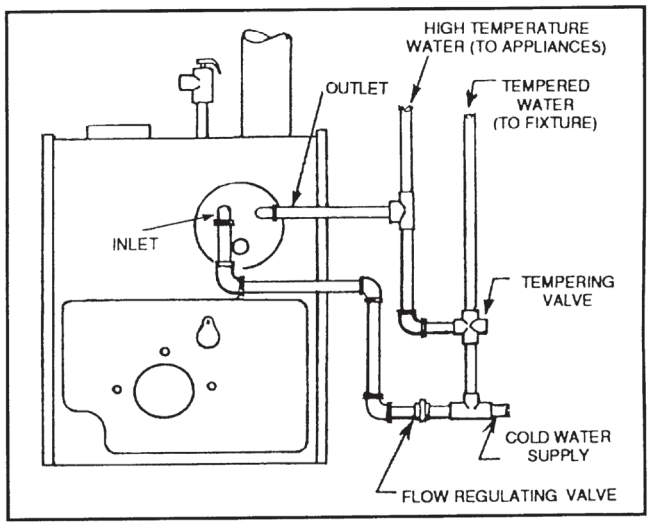


Figure 8. Recommended Piping to Tankless Heater

VENT PIPING AND DRAFT REGULATOR

A. Vent pipes must be installed having the same diameter as the boiler outlet. (See page 2)
B. Vent pipes and Breaching must be pitched upward a minimum of 21 mm/m (¼") per foot.
C. Connect vent pipe to the chimney using as few elbows as possible.
D. Horizontal vent connector into the chimney should not be inserted beyond the inside wall of the chimney.
E. Install barometric draft regulator on vertical or horizontal Breeching, near chimney, with hinge horizontal and face vertical. See manufac turer's instructions packed in carton with barometric draft regulator and page 4.
F. If two or more appliances are used on the same chimney, see CHIMNEY, page 3 and 4.
G. Make up all joints with minimum air leaks, secure with sheet metal screws.

OPERATING INSTRUCTIONS

PRECAUTIONS BEFORE STARTING OIL BURNER

Make a positive check of A through H before starting burner:

A. Boiler and system are full of water. All air is vented from system. See below.
B. All wiring is completed.
C. Oil supply is connected to the burner; nozzle is installed correctly; oil valve is open at tank.
D. Smokepipe is connected to chimney.
E. All combustible materials are cleared away.
F. Combustion air supply is provided. See page 4.
G. Burner settings are adjusted as per pages 12 14 and as shown on boiler jacket.
H. Main cast iron door on which burner is mounted is bolted shut and fiberglass rope seal is making good contact.
* Draft is negative or suction pressure.

CAUTION: DO NOT START THE BOILER UNLESS ALL CLEAN OUT DOORS ARE SECURED IN PLACE.

WARNING: NEVER OPERATE any natural draft* boiler (TR Series boiler is a natural draft boiler) with zero draft or overfire pressure: early failure of the burner, nozzle and chamber is inevitable if you do. Use a draft gauge, and make sure that overfire draft* is 0.5 mm (.02"), minimum, during all operating conditions.

START-UP (COMBUSTION TEST INSTRUMENTS MUST BE USED)

A. Make sure the boiler is installed and wired properly and is full of water.
B. Open the observation door (on the front, above the burner).
C. Start the oil burner (see burner instructions for bleeding air from oil, etc.). IMMEDIATELY, set burner air bands to obtain a bright fire without smoke or oil stain. Set the DRAFT REGULATOR to obtain 0.5 mm (.02") overfire draft*. Take draft reading through slot in observation door.
D. Close the observation door. Allow the burner to fire for at least one hour total firing time, to bake out the volatile binders in the combus tion chamber before taking final combustion readings.
E. By alternate adjustment of the barometric draft regulator, the burner air regulation and head regulation devices (whichever apply), set for a trace of smoke and as close to 13% CO_2 as you can. Then open the air bands or shutter (whichever apply) an additional 3 mm (⅛"). This should result in zero smoke with NO raw oil on the smoke paper and a smooth light off. DO NOT ATTEMPT TO SET FIRE BY EYE. Flame retention burners may appear efficient and smoke free from an inefficient 7% up to an overly high 14% CO_2. However, a very low CO_2 can also result in poor ignition and raw (unburned) oil entering the fire box. At very high CO_2, any slight decrease in air flow for any reason will cause incomplete combustion, with high smoke and dry soot formation in the fire box.
F. If smoke reading is satisfactory, but CO_2 can not be increased to a satisfactory level (12% or better) or overfire draft of 0.5 mm (0.02") W.C. can not be obtained, check for proper sealing between sec tions, between burner mounting plate and front section, around burner blast tube and around flue collector and collar. If seal is not satisfactory, reseal with furnace putty or silicone with a temperature rating of at least 204°C (400° F). (All safety precautions indicated on material package must be followed.)
G. Once burner and draft have been set up, then smoke, CO_2 and stack temperature should be checked and recorded. If smoke is greater than trace, review the burner instructions; replace the nozzle if necessary. Normal smoke to be expected at approximately 13% CO_2 is zero to a trace.

CLEANING AND FILLING A NEW WATER BOILER

I. BEFORE FILLING WATER BOILER
   A. Check burner to be certain it is ready for firing. DO NOT FIRE into an empty boiler.
   B. Be prepared to heat raw water to at least 82°C (180°F). as soon as it is introduced into the boiler. This procedure will remove dissolved, corrosive gases.
   C. Provide drain line, with valve, from boiler. Use a bottom tapping. Line and drain must be suitable for handling caustic solution.

II. CLEANING WATER BOILER SYSTEM
   A. Prepare a boil out solution of *sodium hydroxide* (caustic soda) or *tri sodium phosphate.*
      NOTE: Use caution in handling chemicals. Caustic soda is harmful to skin, eyes and clothing.
      1. Proportions: 2.25 kg per 190 L (1 lb per 50 gal) of system water.
      2. Stir chemical in water until dissolved and pour into the boiler through a top tapping. Replace plug.
   B. Fill the entire system with water.
   C. Start the burner, using the start up procedure.
   D. Circulate the water through the entire system.
   E. Vent the system, including the radiation.
   F. Allow boiler water to reach operating temperature, if possible.
   G. Continue to circulate the water for a few hours.
   H. Shut off the burner.
   I. With CAUTION, drain the boiler solution to a safe location. DO NOT LEAVE SOLUTION SITTING IN SYSTEM OVER 2 HOURS.
   J. Wash the water side of the boiler thoroughly using a high pres sure water stream. Fill and drain the boiler several times.

III. TREATING WATER FOR CORROSION CONTROL
   (This is not scale control)
   A. Prepare a solution of *sodium chromate*.
      Proportions: 94cc/100L (6 oz. per 50 gallons) of system water.
   B. Stir chemical into water until dissolved and pour into the boiler through a top tapping. Replace plug.

IV. FILLING AND VENTING THE WATER BOILER
   A. Refill the system with fresh water.
   B. Bring water temperature to at least 82°C (180°F) promptly.
   C. Circulate water through entire system.
   D. Vent the system, including the radiation.
   E. The boiler is now ready to be put into service or on standby.
   F. If brand name air control devices are used, venting instructions furnished with the devices should be followed.

V. SAFETY CHECK FOR CONTROL SYSTEM
   High limit control test: Set thermostat high enough for boiler water temperature to reach high limit control setting. When this tempera ture is reached, the high limit switch should open, and the burner should shut off automatically. If the high limit does not operate to shut off the burner, the high limit or the wiring is faulty. Repair or replace immediately.

CLEANING AND FILLING A NEW STEAM BOILER

I. BEFORE USING STEAM BOILER
   A. Check burner to be certain it is ready for firing. DO NOT FIRE into an empty boiler.
   B. Be prepared to heat raw water to at least 82°C (180°F). as soon as it is introduced into the boiler. This procedure will remove dissolved, corrosive gases.
   C. Provide drain line, with valve, from boiler. Use a bottom tapping. Line and drain must be suitable for handling caustic solution.
   D. Check for low water cut off operation, see section below for check out.

WATER CONTENT OF BOILER												
	TR-20		TR-30		TR-40		TR-50		TR-60		TR-70	
	L	U.S.G.	L	U.S.G.	L	U.S.G.	L	U.S.G.	L	U.S.G.	L	U.S.G.
Water Boiler	31.4	8.3	40.5	10.7	49.6	13.1	58.7	15.5	67.4	17.8	85.6	22.6
Steam Boiler			26.1	6.9	33.3	8.8	40.5	10.7	47.7	12.6	54.9	14.6

VOLUME OF WATER IN STANDARD PIPE OR TUBE

Nominal Pipe Size		Standard Steel Pipe					Type L Copper Tube			
		Schedule No.	Inside Diameter		Volume per linear unit.		Inside Diameter		Volume per linear unit.	
mm	in.		mm	in.	L/m	U.S.G/ft.	mm	in.	L/m	U.S.G/ft.
10	3/8						11	0.430	0.093	0.0075
13	1/2	40	16	0.622	0.195	0.0157	14	0.545	.0150	0.0121
16	5/8						17	0.666	0.225	0.0181
19	3/4	40	21	0.824	0.344	0.0277	20	0.785	0.311	0.0251
25	1	40	27	1.049	0.557	0.0449	26	1.025	0.532	0.0429
32	1¼	40	35	1.380	0.967	0.0779	32	1.265	0.810	0.0653
38	1½	40	41	1.610	1.315	0.106	38	1.505	1.147	0.0924
51	2	40	53	2.067	2.159	0.174	50	1.985	1.998	0.161
64	2½	40	63	2.469	3.090	0.249	63	2.465	3.078	0.248
76	3	40	78	3.068	4.765	0.384	75	2.945	4.393	0.354

II. CLEAN STEAM BOILER SYSTEM.
- A. Fill the boiler to water line indicated on the boiler.
- B. Follow start up procedure for burner and operate the boiler with steam in the entire system for 2 or 3 days to bring oil and dirt from the system to the boiler. While system is in operation, maintain the proper water level in the boiler by slowly adding water to the boiler.
- C. Shut down burner, cool down boiler and drain system.
- D. Procedure to dissolve oil and grease in boiler:
  1. Fill boiler to proper water line.
  2. Prepare a boil out solution of *sodium hydroxide* (caustic soda) and *tri sodium phosphate*:
     NOTE: Use caution in handling chemicals. Caustic soda is harmful to skin, eyes and clothing.
     (a) Proportions: 2.25 kg per 190 L (1 lb per 50 gal) of system water.
     (b) Stir chemicals into water until dissolved and pour into the boiler through a top tapping. Replace plug.
  3. Start the burner; boil the water for at least 5 hours; shut off the burner.
- E. With CAUTION, drain the boiler solution to a safe location. DO NOT LEAVE SOLUTION SITTING IN SYSTEM OVER 2 HOURS.
- F. Wash the water side of the boiler thoroughly using a high pres sure water stream. Fill and drain the boiler several times.

III. TREATING WATER FOR CORROSION CONTROL
(This is not scale control)
- A. Prepare a solution of *sodium chromate*.
  Proportions: 2.25 kg per 190 L (1 lb per 50 gal) of boiler water.
- B. Stir chemical in water until dissolved and pour into boiler through a top tapping. Replace plug.

IV. FILLING AND VENTING THE STEAM BOILER
- A. Refill the boiler to the indicated water line.
- B. Bring water to boiling temperature, promptly.
- C. The boiler is now ready to be put into service or on standby.

BLOWING OFF A LOW PRESSURE STEAM BOILER

A. A 1 1/2" NPT tapping is provided in the front of the boiler (tapping no. 9, figure 1) for use as a surface blow down to provide rapid skimming of oil and grease which accumulate on the surface of the water. The boiler should be blown down as outlined below.

B. Turn off electrical power supply to boiler. Allow boiler to cool down and steam pressure to reduce to zero before removing skimmer tapping plug. Check for steam pressure by testing the pop safety valve. Keep your hands and all parts of your body away from the discharge end of the safety valve. Drain boiler down one to two inches below skimmer tapping. The water might be hot. Remove skimmer plug slowly and carefully install a 150 psi malleable iron 1 1/2" NPT street elbow, a 1 1/2" NPT skimmer valve and length of pipe and place a bucket underneath the open end of the pipe. Cover bucket with a piece of cloth. (See figure 9)

C. Fill boiler slowly until water level is two inches from top of gauge glass. (This is the starting water level for skimming only.) Fire boiler to produce steam. If the system is heavily laden with oil, it may be difficult to obtain much more than a pound or so of pressure. Set the pressure control at about 48 kPa (7 psi). The higher the steam pres sure you can use, the better and faster the cleaning.

D. As steam develops, open the SKIMMER drain valve with caution to skim the oil and film from the top of the water. DO NOT open the boiler drain valve. Close the skimmer drain valve when the water level drops to about 127 mm (5") from the top of the gauge glass. The water may stop before the level drops to 127 mm (5")below the top of the glass. Refill boiler until water level is again two inches from the top of the gauge glass.

E. Repeat (D) above until all film is skimmed off and the water settles to a normal movement. Add make up fresh water to the boiler as described in (D) above, during the blow off operation, to maintain the proper skimming water level in the vessel. Empty bucket fre quently in order to see the difference in water cleanliness.

F. When surging has stopped and water is clean, and no film can be seen floating in the bucket, shut off boiler, drain down to level of skimmer tapping, remove valve, plug skimmer tapping and refill the

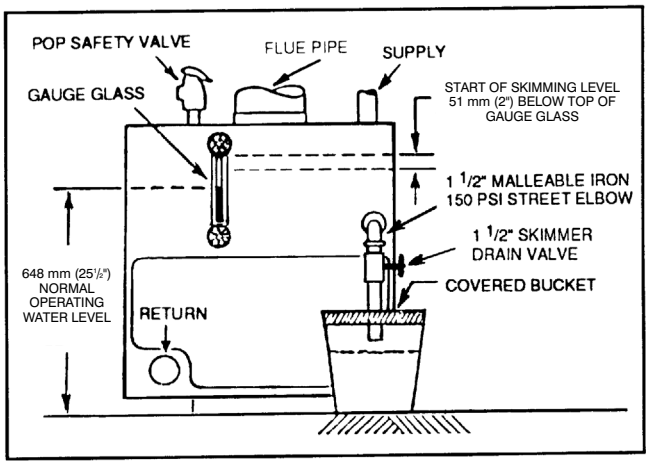


Figure 9

boiler to 622 mm (24½") water level. After 15 minute operation, readjust level to normal operating level of 648 mm (25½") from bottom of boiler (see figure 9). Check the pop safety valve for proper operation. Check the low water cut off operation, see below.

G. The entire process may have to be repeated over a period of a few days on extremely fouled systems.

LOW WATER CUT-OFF CHECK-OUT

I. Electronic probe type low water cut off
If this boiler is factory equipped with an electronic probe type low water cut off, operation of cut off should be checked at least twice a year as follows:
   A. While boiler is running, drain down boiler water slowly through Boiler Drain Cock shown on page 2, just until light goes on. Boiler should shut down 10 seconds after light goes on.
   B. Be sure that it is the low water cut off and not the room thermo stat, pressure cut out, or other control that has shut off the burner.
   C. Refill the boiler and repeat test.
   D. Refill the boiler and reset controls for normal operation.

II. Float type low water cut off
If this boiler is factory equipped with a McDonnell & Miller float type low water cut off, the low water cut off must be blown down (flushed), at least once a week.

CAUTION: When flushing float type low water cut off control, hot water and steam will flow out the blow down valve. Blow down valve is illus trated below. (Fig. 10)

A. SPECIAL FLUSHING INSTRUCTIONS
For new boiler installed in old system.
Installation of new boiler may break loose a heavy accumulation of sediment and scale from old piping and radiators. It is extremely important to blow down your McDonnell cut off more frequently the first week.
First week 3 times
Thereafter at least once a week.

B. As boiler water circulates through the float chamber, dirt or other sediment may be deposited. This chamber is extra deep. But the only sure way to keep any accumulation from interfering with float action is to "blow down", or flush out, the control once a week. Do it while boiler is in operation. First note water level in gauge glass. Open blow off valve at bottom of control; water will pour out, flushing away sediment. Drain until water is clear about a pail then close valve. If level in gauge glass has dropped, add water to boiler to restore level.

C. NOTE: Opening blow off valve checks cut off operation too. As float drops with falling water level, burner will stop. After burner is off and normal operating conditions restored, burner will resume firing.

D. Be sure that it is the low water cut off and not the room thermostat, pressure cut out, or other control that has shut off the burner.

PRESSURE CONTROL CHECK-OUT

A. Check burner to be certain it is ready for firing. DO NOT FIRE into an empty boiler.

B. Set thermostat high enough for boiler to make steam. Set the pres sure control down to its lowest setting. As the boiler starts to pro duce steam, the steam pressure will start to build. The burner will shut off when the steam pressure exceeds the pressure setting (plus differential if control has this feature).

C. Adjust the pressure control to a higher setting. The higher setting should be above the steam pressure in the boiler. This should turn the burner back on.

D. Reset the pressure control as needed for the system. The pressure control should be checked at least twice a year.

REPLACEMENT OF STEAM BOILERS

Anytime an older steam boiler is removed from the heating system and replaced with a new boiler, there are certain conditions that have to be examined on the heating system.

A. Steam systems have a tendency to develop scale inside the wet return lines and the boiler. The older the system the greater the accumulation of scale that can exist inside the piping. Therefore, it is necessary when replacing a steam boiler to check the piping for blockage or restrictions. Clean or replace the piping as required. (See special flushing instructions on this page.)

B. Replace all buried wet return lines.

C. All equipment (air vents, radiation equipment, etc.) in the steam heating system should be checked for proper operation. All piping should be checked for proper pitch.

D. It is good engineering practice to repack or tighten the packing nuts on all valves in the heating system.

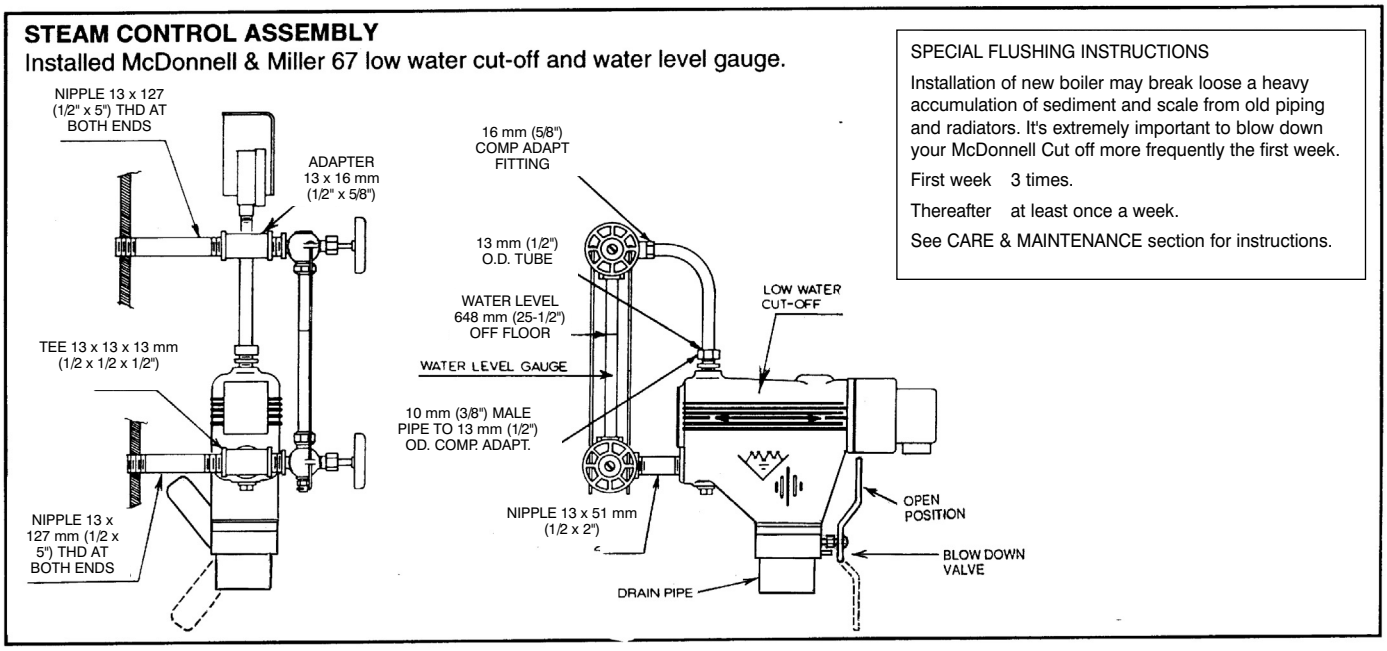
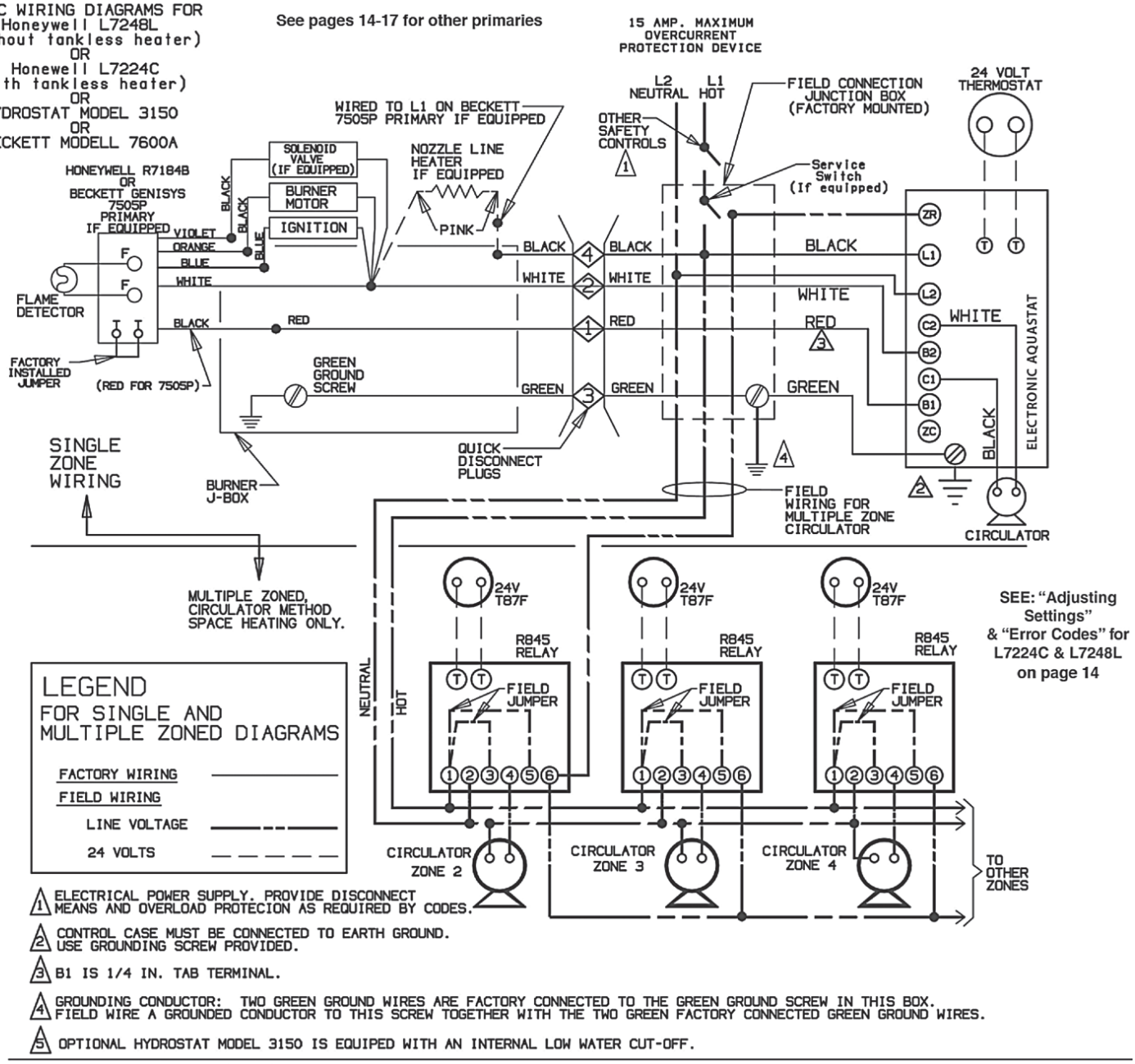

STEAM CONTROL ASSEMBLY
Installed McDonnell & Miller 67 low water cut-off and water level gauge.
NIPPLE 13 x 127 (1/2" x 5") THD AT BOTH ENDS
ADAPTER 13 x 16 mm (1/2" x 5/8")
TEE 13 x 13 x 13 mm (1/2 x 1/2 x 1/2")
NIPPLE 13 x 127 mm (1/2 x 5") THD AT BOTH ENDS
16 mm (5/8") COMP ADAPT FITTING
13 mm (1/2") O.D. TUBE
WATER LEVEL 648 mm (25-1/2") OFF FLOOR
WATER LEVEL GAUGE
10 mm (3/8") MALE PIPE TO 13 mm (1/2") OD. COMP. ADAPT.
LOW WATER CUT-OFF
NIPPLE 13 x 51 mm (1/2 x 2")
DRAIN PIPE
OPEN POSITION
BLOW DOWN VALVE
SPECIAL FLUSHING INSTRUCTIONS
Installation of new boiler may break loose a heavy accumulation of sediment and scale from old piping and radiators. It's extremely important to blow down your McDonnell Cut off more frequently the first week.
First week 3 times.
Thereafter at least once a week.
See CARE & MAINTENANCE section for instructions.

Fig. 10

BASIC WIRING DIAGRAMS FOR
Honeywell L7248L
(without tankless heater)
OR
Honewell L7224C
(with tankless heater)
OR
HYDROSTAT MODEL 3150
OR
BECKETT MODELL 7600A

See pages 14-17 for other primaries



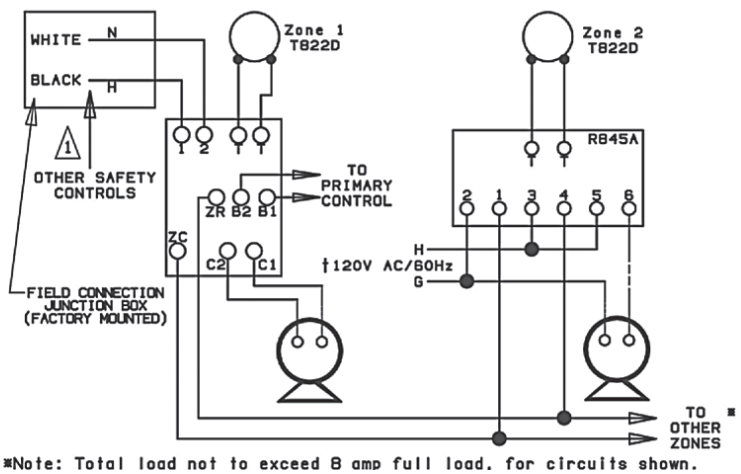
SEE: "Adjusting Settings" & "Error Codes" for L7224C & L7248L on page 14

LEGEND
FOR SINGLE AND MULTIPLE ZONED DIAGRAMS

- FACTORY WIRING
- FIELD WIRING
  - LINE VOLTAGE
  - 24 VOLTS

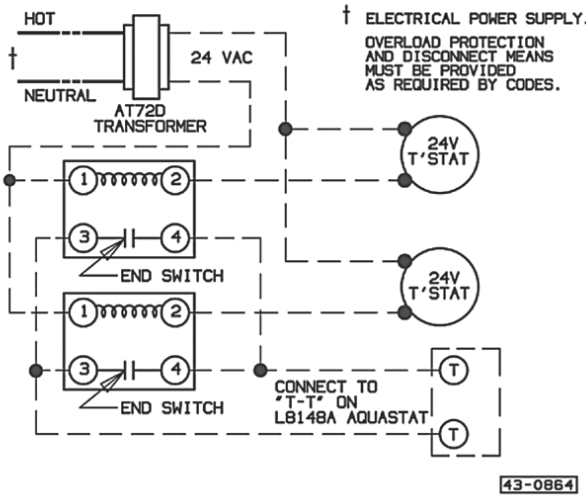
1. ELECTRICAL POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECION AS REQUIRED BY CODES.
2. CONTROL CASE MUST BE CONNECTED TO EARTH GROUND. USE GROUNDING SCREW PROVIDED.
3. B1 IS 1/4 IN. TAB TERMINAL.
4. GROUNDING CONDUCTOR: TWO GREEN GROUND WIRES ARE FACTORY CONNECTED TO THE GREEN GROUND SCREW IN THIS BOX. FIELD WIRE A GROUNDED CONDUCTOR TO THIS SCREW TOGETHER WITH THE TWO GREEN FACTORY CONNECTED GREEN GROUND WIRES.
5. OPTIONAL HYDROSTAT MODEL 3150 IS EQUIPED WITH AN INTERNAL LOW WATER CUT-OFF.

ZONE WIRING DIAGRAM
CIRCULATOR METHOD FOR L8124, L7224C OR OPTIONAL HYDROSTAT #3150 CONTROLS.
(FOR TANKLESS HEATER APPLICATIONS)



*Note: Total load not to exceed 8 amp full load. for circuits shown.

MULTIPLE ZONED, ZONE VALVE METHOD
USING HONEYWELL V8043F OR ERIE 765



43-0864

FOR L7248L

Enter adjustment Mode by pressing ""Up", "Down" and "I" buttons simultaneously for 3 seconds.

"I" button changes display feature.

"Up" and "Down" buttons change settings.

DISPLAY	FEATURE
HL	Set High Limit temperature from 130 to 240 F (5-116 C)
FP	Freeze Protection. Turn on or off. "On" fires boiler at 40 F.
ELL	External Low Limit. "Off" if not using.
duu	Zr Input External DHW. Off if not using.
ASC	Anti Short Cycle Timeout (seconds) set "OFF" or up to 5 Min.
tPL	Thermal Purging Limit Temperature (F or C) "OFF" to disable.
tPt	Thermal Purging Time Delay (minutes) shown only if tPL is enabled.
PC	Pump Cycling - pump runs for 15 sec after 5 days of no activity.
	set "ON" or "OFF"
F-C	Temperature Units (F or C)
	After 60 seconds without any button inputs, the control will automatically return to the RUN mode.
	To re-enter the adjustment mode follow the instructions above.
	In the adjustment mode pressing the "I" button repeatedly will cycle through the display feature if you need to change a previous entry.

* When not using Outdoor Reset Kit
NOTE: When using an outdoor reset kit refer to the Honeywell Instruction Booklet.

Error Code	Cause/Action
Err1	Sensor fault; check sensor.
Err2	ECOM fault; check EnviraCOM™ wiring
Err3	Hardware fault; replace control.
Err4	B1 fault; check B1 wiring/vollage.
Err5	Low Line; Check L1-L2, 110 Vac.
Err6	Fuse; Check ECOM wires, replace fuse.
Err7	EEPROM, HL, LL, Hdf. Ldf: reset to default values. Restore desired settings.
Err8	Repeated B1 fault (no voltage present at B1 when output is turned on water temperature above 260F when voltage present at B1); check B1 wiring/voltage.

DESCRIPTION

Boiler Temperature - bt
High Limit - HL
Low Limit - LL
Low Limit Differential - LdF
Local Thermostat Status - tt
Enviracom Thermostat Status - ttE
Error Code - Err
Degrees Fahrenheit - °F
Degrees Celsius - °C

DISPLAY

In the RUN mode, the Aquastat will flash.bt. (boiler temp) followed by the temperature (i.e., 220), followed by °F or °C.

To read boiler settings, press the I key to read the parameter of interest.
For example, Press I High Limit
(HL) is displayed, followed by a three-digit number, i.e.,220, followed by °F or °C.

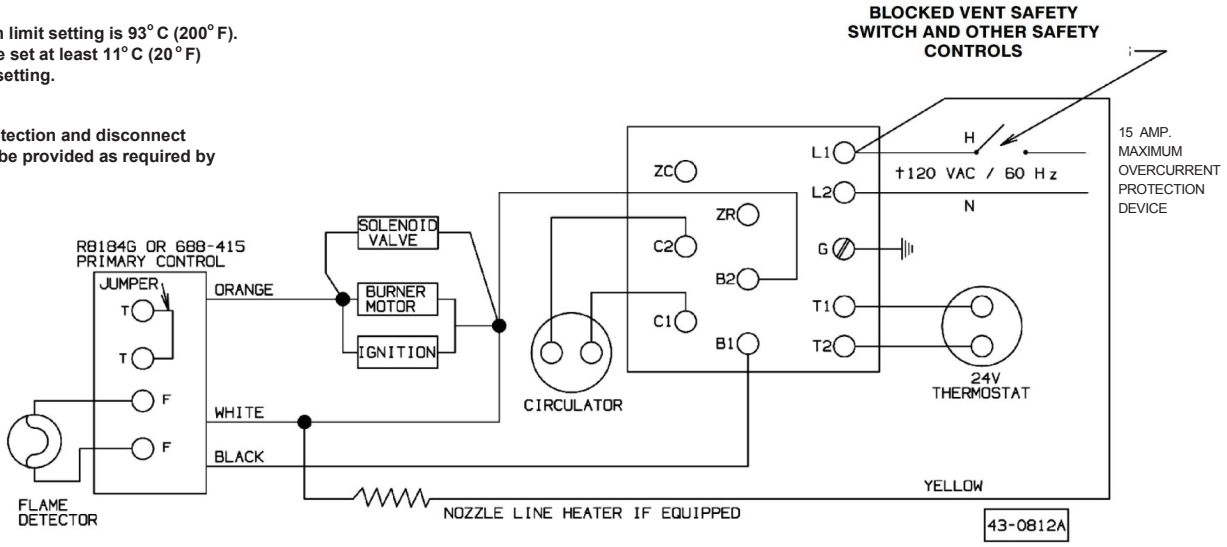
BASIC WIRING DIAGRAMS

L7248L OR L7224C
(WITH TANKLESS HEATER)

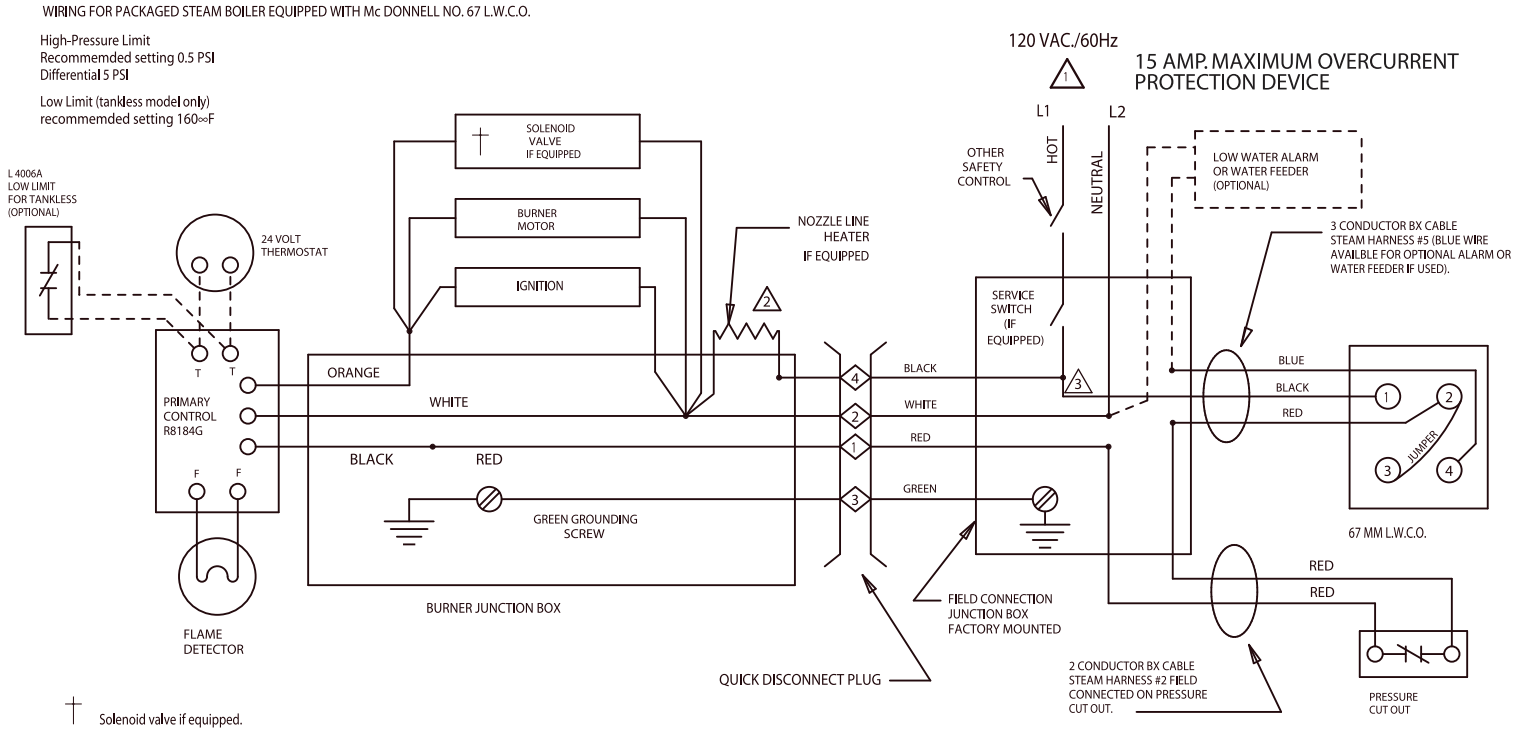
NOTES:

Recommend high limit setting is 93° C (200° F). Low limit must be set at least 11° C (20° F) below high limit setting.

† **Overload protection and disconnect switch must be provided as required by local codes.**

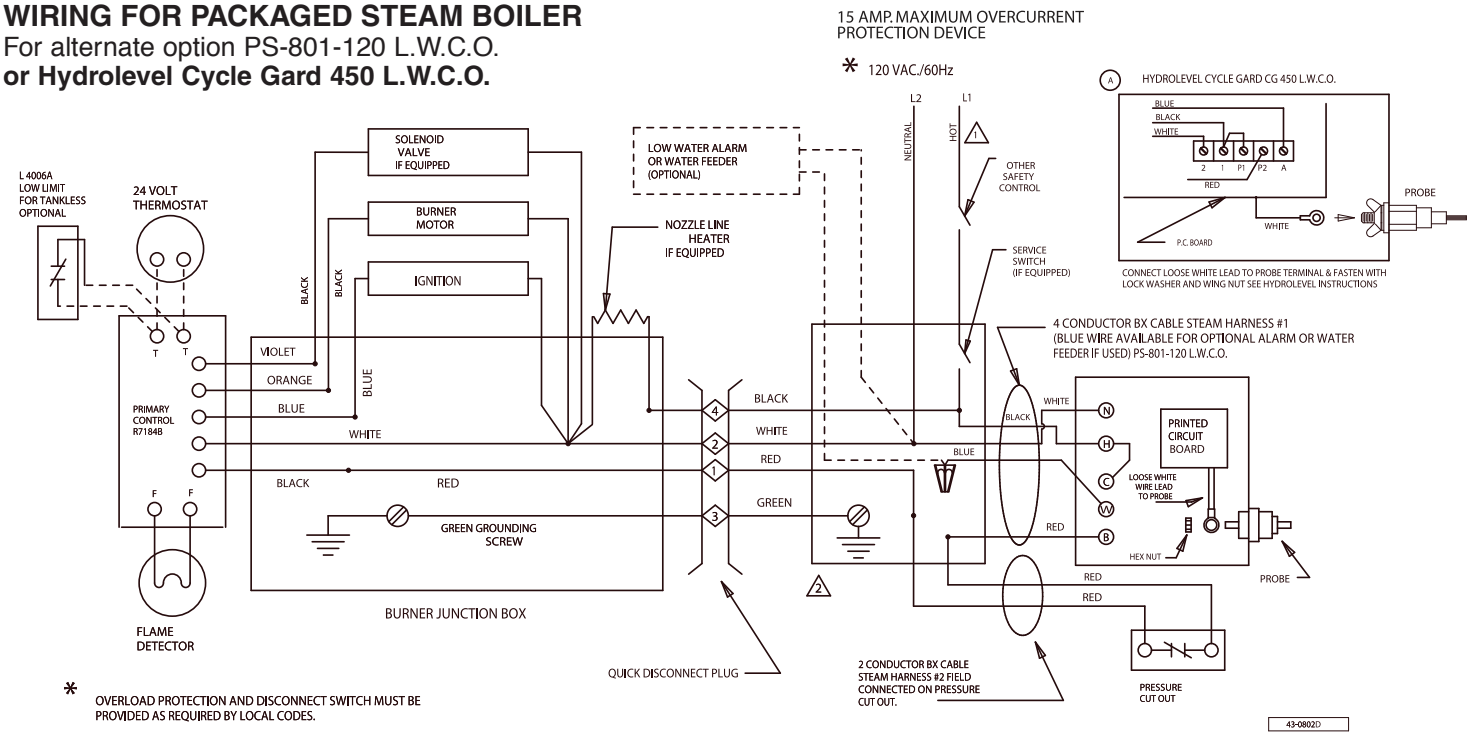


WIRING FOR PACKAGED STEAM BOILER EQUIPPED WITH McDONNELL NO.67 L.W.C.O.



WIRING FOR PACKAGED STEAM BOILER

For alternate option PS-801-120 L.W.C.O.
or Hydrolevel Cycle Gard 450 L.W.C.O.

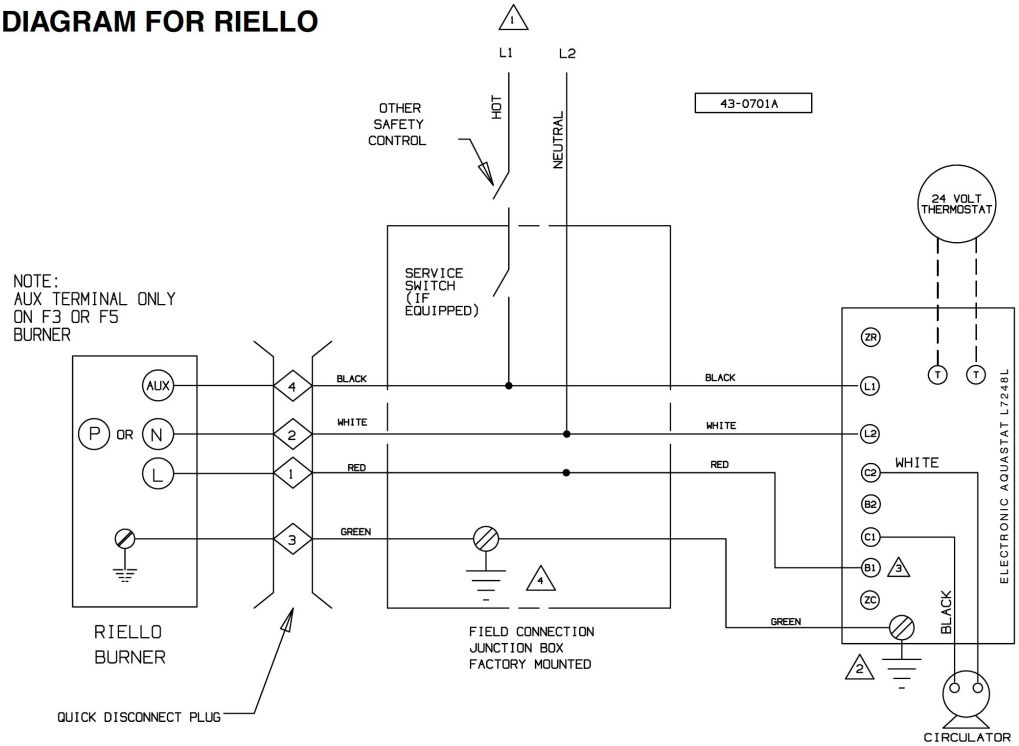


* OVERLOAD PROTECTION AND DISCONNECT SWITCH MUST BE PROVIDED AS REQUIRED BY LOCAL CODES.

1 ELECTRICAL POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED BY CODES.

2 GROUNDING CONDUCTOR: GREEN GROUND WIRES ARE FACTORY CONNECTED TO THE GREEN GROUND SCREW IN THIS BOX. FIELD WIRE A GROUNDED CONDUCTOR TO THIS SCREW TOGETHER WITH THE GREEN FACTORY CONNECTED GREEN WIRES.

BOILER WIRING DIAGRAM FOR RIELLO



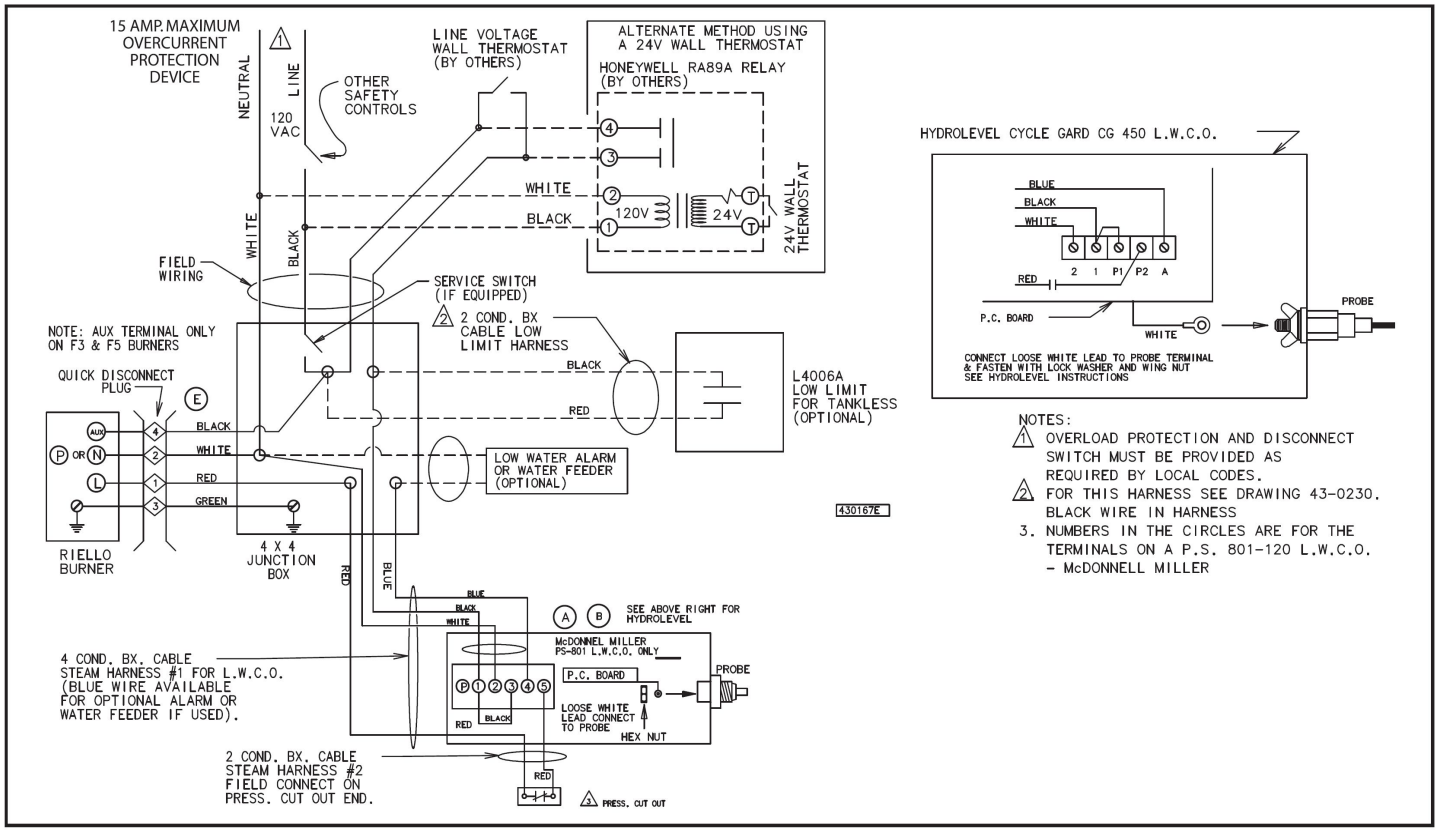
1 ELECTRICAL POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED BY CODES.

2 CONTROL CASE MUST BE CONNECTED TO EARTH GROUND. USE GROUNDING SCREW PROVIDED.

3 B1 IS 1/4IN. TAB TERMINAL.

4 GROUNDING CONDUCTOR: TWO GREEN GROUND WIRES ARE FACTORY CONNECTED TO THE GREEN GROUND SCREW IN THIS BOX. FIELD WIRE A GROUNDED CONDUCTOR TO THIS SCREW TOGETHER WITH THE TWO GREEN FACTORY CONNECTED GREEN GROUND WIRES.

STEAM BOILER WIRING FOR RIELLO BURNER AND McDONELL MILLER P.S. 801 L.W.C.O. FOR CONNECTION TO LINE VOLTAGE WALL THERMOSTAT (BY OTHERS)


15 AMP. MAXIMUM OVERCURRENT PROTECTION DEVICE
NEUTRAL
LINE
120 VAC
OTHER SAFETY CONTROLS
LINE VOLTAGE WALL THERMOSTAT (BY OTHERS)
ALTERNATE METHOD USING A 24V WALL THERMOSTAT
HONEYWELL RA89A RELAY (BY OTHERS)
WHITE
BLACK
120V
24V
24V WALL THERMOSTAT
FIELD WIRING
SERVICE SWITCH (IF EQUIPPED)
2 COND. BX CABLE LOW LIMIT HARNESS
NOTE: AUX TERMINAL ONLY ON F3 & F5 BURNERS
QUICK DISCONNECT PLUG
L4006A LOW LIMIT FOR TANKLESS (OPTIONAL)
LOW WATER ALARM OR WATER FEEDER (OPTIONAL)
RIELLO BURNER
4 X 4 JUNCTION BOX
430167E
4 COND. BX. CABLE STEAM HARNESS #1 FOR L.W.C.O. (BLUE WIRE AVAILABLE FOR OPTIONAL ALARM OR WATER FEEDER IF USED).
SEE ABOVE RIGHT FOR HYDROLEVEL
McDONNEL MILLER PS-801 L.W.C.O. ONLY
P.C. BOARD
PROBE
LOOSE WHITE LEAD CONNECT TO PROBE
HEX NUT
2 COND. BX. CABLE STEAM HARNESS #2 FIELD CONNECT ON PRESS. CUT OUT END.
PRESS. CUT OUT
HYDROLEVEL CYCLE GARD CG 450 L.W.C.O.
BLUE
BLACK
WHITE
RED
2 1 P1 P2 A
P.C. BOARD
PROBE
CONNECT LOOSE WHITE LEAD TO PROBE TERMINAL & FASTEN WITH LOCK WASHER AND WING NUT SEE HYDROLEVEL INSTRUCTIONS

NOTES:

1. OVERLOAD PROTECTION AND DISCONNECT SWITCH MUST BE PROVIDED AS REQUIRED BY LOCAL CODES.
2. FOR THIS HARNESS SEE DRAWING 43-0230. BLACK WIRE IN HARNESS
3. NUMBERS IN THE CIRCLES ARE FOR THE TERMINALS ON A P.S. 801-120 L.W.C.O. - McDONNELL MILLER

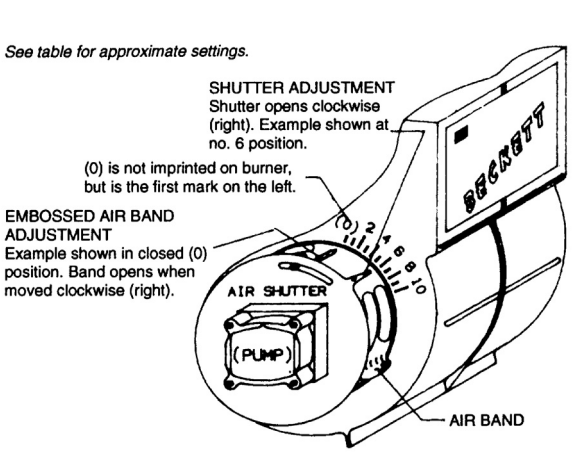
BURNER DATA—BECKETT BURNERS FOR PACKAGED BOILERS ONLY

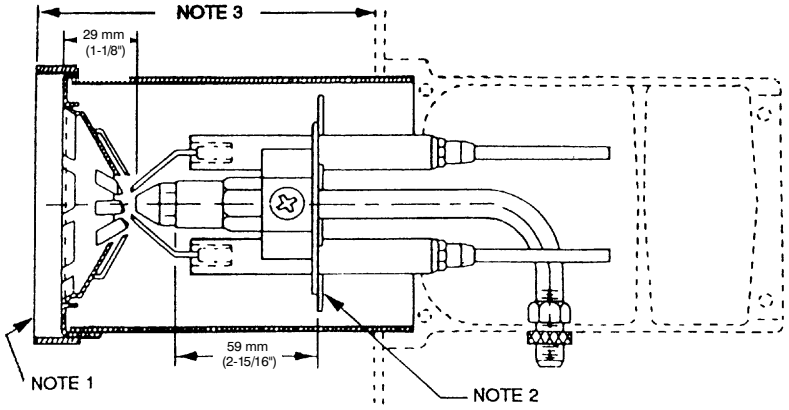
BOILER MODEL	BURNER MODEL*	BURNER HEAD	FIRING RATE NO. 2 OIL		NOZZLES			MFR.	OIL PUMP PRESSURE SETTING		APPROXIMATE AIR SHUTTER SETTING NO. †	APPROXIMATE AIR BAND SETTING NO. †
					SIZE		ANGLE AND TYPE					
			L/hr	GPH	L/hr	GPH			kPa	PSIG		
TR 30	AFG SF 1801	F4S	4.17	1.10	4.17	1.10	80° ES	HAGO	689	100	9	CLOSED
							80° W	DELAVAN				
			4.74	1.25	4.74	1.25	80° ES	HAGO	689	100	10	1/2
							80° W	DELAVAN				CLOSED
TR 40	AFG SF 1802	F120	6.06	1.60	5.69	1.50	80° ES	HAGO	779	113	10	1 1/4
							80° B	DELAVAN	779	113	10	1 1/2
			6.82	1.80	6.63	1.75	80° SS	HAGO	723	105	10	3
							80° B	DELAVAN				
TR 50	AFG SF 1803	F164	7.96	2.10	7.58	2.00	80° P	HAGO	758	110	10	1 1/2
							80° W	DELAVAN				
			8.91	2.35	8.53	2.25	80° P	HAGO	751	109	10	3 1/2
							80° W	DELAVAN				

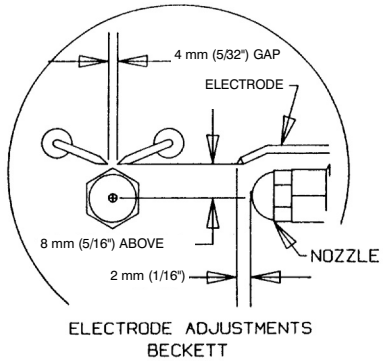
† Air shutter and air band settings are approximate ONLY. See START UP page 9.

* All burner models shown are single stage.

NOTE: 1. Extended heads on all units
2. No static plate for TR 50 only.
3. Insertion depth: 55 mm (2 5/32) for TR 30 and TR 40, 67 mm (2 21/32) for TR 50.
4. Air Band: 2 slot for TR 30, 4 slot for TR 40, 8 slot for TR 50


See table for approximate settings.
SHUTTER ADJUSTMENT
Shutter opens clockwise (right). Example shown at no. 6 position.
(0) is not imprinted on burner, but is the first mark on the left.
EMBOSSED AIR BAND ADJUSTMENT
Example shown in closed (0) position. Band opens when moved clockwise (right).
BECKETT
AIR SHUTTER
(PUMP)
AIR BAND





ELECTRODE ADJUSTMENTS
BECKETT

BURNER DATA—RIELLO BURNERS FOR PACKAGED BOILERS ONLY

BOILER MODEL	BURNER MODEL*	BURNER DESCRIPTION	FIRING RATE NO. 2 OIL		NOZZLES			MFR.	OIL PUMP PRESSURE SETTING		AIR GATE SETTING NO. †	TURBULATOR SETTING NO. †
					SIZE		ANGLE AND TYPE					
			L/hr	GPH	L/hr	GPH			kPa	PSIG		
TR 20	Series 40 F 3	SBT	2.84	0.75	2.46	0.65 0.65	80°W 80°B	Delevan Hago	930	135	2.9	0.0
TR 30H	Series 40 F 5	SBT	3.78	1.00	3.21	0.85	80°A 60°H	Delevan Hago	965	140	2.3	0.0
TR 30	Series 40 F 5	SBT	4.17	1.10	3.41	0.90 0.90	60°B	Delevan Hago	1033	150	2.6	0.0
TR 30	Series 40 F 5	SBT	4.73	1.25	4.17	1.10 1.10	80°B 60°B	Delevan Hago	895	130	3.25	0.0
TR 40H	Series 40 F 10	SBT	5.67	1.50	4.73	1.25	60°B	Delevan Hago	1000	145	2.5	0.0
TR 40	Series 40 F 10	SBT	6.06	1.60	5.11	1.35 1.35	60°W 60°B	Delevan Hago	965	140	2.7	1.0
TR 40	Series 40 F 10	SBT	6.82	1.80	5.68	1.50 1.50	80°W 60°B	Delevan Hago	999	145	2.8	1.5
TR 50H	Series 40 F 10	SBT	7.56	2.00	6.24	1.65	60°B	Delevan Hago	1034	150	4.0	1.5
TR 50	Series 40 F 10	SBT	7.96	2.10	6.63	1.75 1.75	60°B 60°B	Delevan Hago	999	145	4.2	1.5
TR 50	Series 40 F 10	SBT	8.91	2.35	7.57	2.00 2.00	60°B 60°B	Delevan Hago	965	140	3.9	3.0
TR 60	Series 40 F 10	SBT	9.85	2.60	8.52	2.25 2.25	60°B 60°B	Delevan Hago	930	135	4.2	4.0
TR 60	Series 40 F 10	SBT	10.8	2.85	9.47	2.25 2.25	60°B 60°B	Delevan Hago	1102	160	5.75	4.0
TR 70	Series 40 F 15	LBT	11.75	3.10	9.47	2.50 2.50	45°B 60°B	Delevan Hago	1068	155	2.5	2.0
TR 70	Series 40 F 15	LBT	12.7	3.35	10.41	2.75 2.75	45°B 45°P	Delevan Hago	1033	150	2.6	3.0

† Air shutter and head settings shown are approximate ONLY. See START-UP page 9.
* All burner models shown are single stage.

NOTE: For proper insertion into combustion chamber see figure 14.

NOTE: ELECTRODES ARE PRESET AT THE FACTORY.

REGULATION OF THE TURBULATOR AND AIR SHUTTER FOR PROPER COMBUSTION

Turbulator Setting

1. Loosen nut, 1, then turn the screw, 2, until the index marker, 3, is aligned with the correct index number. (Fig. 12 A, B).
2. Retighten the retaining nut, 1.

TURBULATOR SETTINGS - RIELLO 40 SERIES

The numbers on the casting are there to denote the high and low end of the scale in all cases the first mark is "Zero".
The air/oil ratio depends on accurate setting of the turbulator disc. Be careful when making this adjustment as an incorrect setting will result in an unsatisfactory installation. See figures 12A and B.

Figure 11 Riello 40 Series

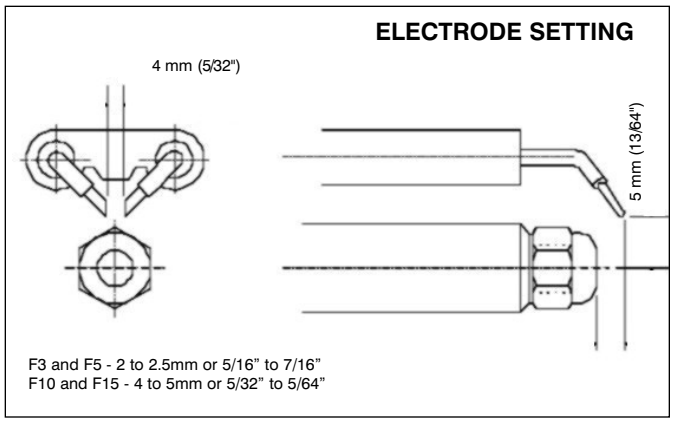


Figure 12A

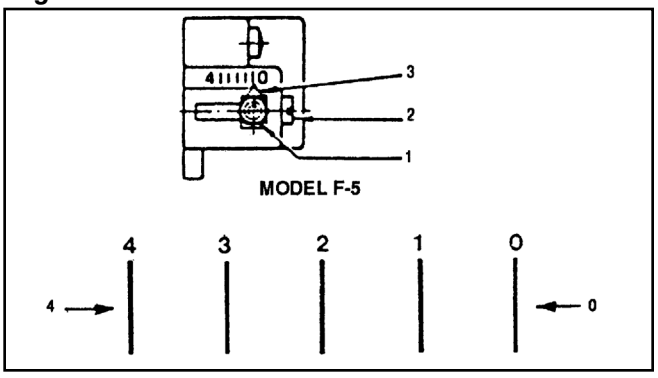
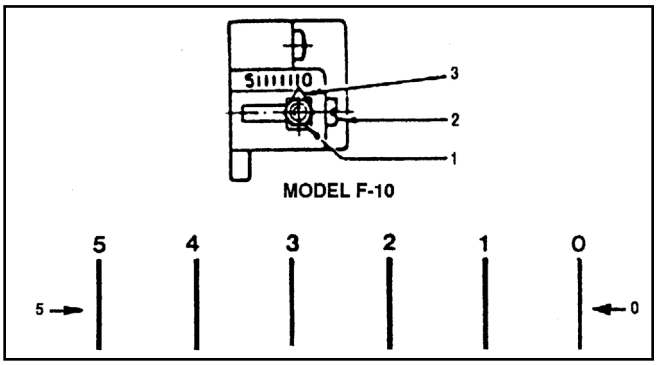


Figure 12B



SETTING THE AIR ADJUSTMENT PLATE (See figure 13)

1. The AIR SHUTTER (A) assures complete opening of the combustion air intake. Regulation of the combustion air flow is made by adjustment of the manual AIR ADJUSTMENT PLATE (D) after loosening the FIXING SCREWS (C and E). The initial setting of the air adjustment plate should be made according to page 13.
2. The proper number on the manual AIR ADJUSTMENT PLATE (D) should line up with the SETTING INDICATOR (B) on the fan housing cover. Once set, the air adjustment plate should be secured in place by tightening SCREWS C and E. Manually open and release the air shutter to ensure it has free movement.
3. The final position of the air adjustment plate will vary on each instal lation. Use instruments to establish the proper settings for maximum CO_2 and a smoke reading of zero.

NOTE: Variations in flue gas, smoke, CO_2 and temperature readings may be experienced when the burner cover is put in place. Therefore, the burn er cover **must** be in place when making the final combustion instru ment readings, to ensure proper test results.

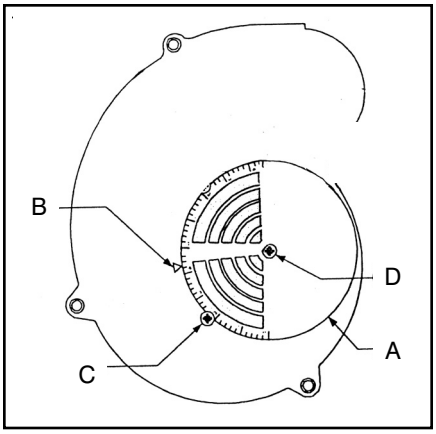
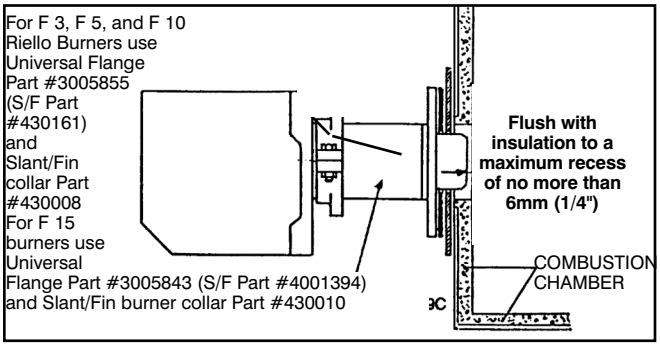


FIgure 13

FIgure 14

FOR PROPER INSERTION INTO COMBUSTION CHAMBER


For F 3, F 5, and F 10 Riello Burners use Universal Flange Part #3005855 (S/F Part #430161) and Slant/Fin collar Part #430008 For F 15 burners use Universal Flange Part #3005843 (S/F Part #4001394) and Slant/Fin burner collar Part #430010
Flush with insulation to a maximum recess of no more than 6mm (1/4")
COMBUSTION CHAMBER

CARE AND MAINTENANCE

CAUTION: DO NOT ATTEMPT TO START THE BURNER WHEN EXCESS OIL HAS ACCUMULATED, WHEN THE UNIT IS FULL OF VAPOUR OR WHEN THE COMBUSTION CHAMBER IS VERY HOT.

CAUTION: DO NOT TAMPER WITH THE UNIT OR CONTROLS. CALL YOUR SERVICE PERSONNEL.

I. EXTENDED SHUTDOWN, CLEANING OR REMOVAL OF BOILER FROM SERVICE IN AREAS NOT SUBJECT TO FREEZING.

DANGER: Use CAUTION when handling chemicals and draining hot water from a boiler. Scalding water and/or chemicals can cause per manent injury to the skin, eyes and respiratory system.

A. Shut down burner by disconnecting all electrical power to the burn er by turning OFF the BURNER EMERGENCY SWITCH of this boil er. After shutting down burner, while the boiler is still hot (82°C TO 93°C [180°F to 200°F]), drain water from the bottom of the boiler until it runs clear.

B. Provide corrosion protection conditioning to the boiler water in the heating system. There are a number of commercial heating system preparations available from your distributor. Follow the preparation manufacturer's instructions.

1. For steam boilers, maintain a *sodium chromate* solution strength of 2.25 kg per 190 L (1 lb per 50 gal) of water; and refill to the top of the gauge glass.
2. For water boilers, maintain a *sodium chromate* solution strength of 2.25 kg per 190 L (1 lb per 50 gal) of water, and refill to normal fill pressure with system vented.
3. Raise water temperature to at least 82°C (180°F). for one hour to release dissolved gases.
4. Shut down burner by disconnecting the main switch.

C. To clean the fireside surfaces, first shut down burner by disconnect ing all electrical power to the burner by turning OFF the OIL BURN ER EMERGENCY SWITCH. (See IV. General Maintenance).

1. Inspect the burner combustion head. Clean if necessary and make sure all the adjustments are correct. (See burner data pages for the burner installed.) Replace oil nozzle with new one and readjust electrodes. To insure proper burner operation ONLY THE NOZZLES SPECIFIED IN THIS MANUAL OR ON THE BURN ER LABEL SHOULD BE USED FOR REPLACEMENT.
2. Protect all of the fireside surfaces by swabbing with neutral miner al oil.
3. Close main cast iron burner door (door on which burner is mount ed). Make sure that the entire seal (fiberglass rope) is making good contact with the boiler casting when replacing 3/8 16 x 25 mm (1") long hex head bolt and tightening.
4. Check the flue collector seal. This is the flat rope seal on top of the heat exchanger. The rope must be in place adjacent to the long bosses on front and rear sections and adjacent to the short bosses on the intermediate sections. The rope should be directly under the flue collector flanges when the flue collector is replaced. Use the two 1/4 20 x 19 mm (¾") washer hex head screws to fasten the flue collector. In order to assure a proper seal be sure that the flue collector is compressing the flat rope and not hanging up on the section bosses. Tighten the two screws.

D. If boiler room is damp, provide ventilation.

CAUTION: ALWAYS KEEP THE OIL SUPPLY VALVE SHUT OFF IF THE BURNER IS TO BE SHUT DOWN FOR AN EXTENDED PERIOD OR TIME.

II. Water Treatment

Treatment for boiler feed water should be considered in areas of known problems, such as where a high mineral content and hard ness exist. Antifreeze may be added to the system water to protect the system. Please adhere to the specifications given by the antifreeze manufacturer. Do not use automotive, ethylene glycol, undiluted or petroleum-based antifreeze. Personal injury, death or property damage can result. Inhibited propylene glycol, especially made for hydronic systems, is recommended. An antifreeze/water mixture may require a backflow preventer within the automatic water feed piping. Check that components such as diaphragm expansion tanks, radiation, pumps etc. are suitable for and sized for use with glycol A 40% antifreeze content normally will provide freeze-up protection to -10°F / -23°C. A 50% solution will normally provide freeze-up protection to about -30°F / -34°C.

Note:

- Do not use antifreeze other than specifically made for hot water heating systems.
- System may contain components which might be negatively affect ed by antifreeze.
- Check total system frequently when filled with antifreeze.
- Advise system operator and/or owner that system is filled with a glycol mix.
- Follow antifreeze manufacturer's instructions.

III. OIL BURNER

ALL SERVICE TO THE OIL BURNER, OIL FILTER, OIL STRAINER, ETC., SHOULD BE PERFORMED BY A PROFESSIONALLY TRAINED SERVICE PERSON.

Inspect and clean annually and following any period of improper oper ation. Recheck and adjust settings as specified for burner model and nozzle size. Set burner air and draft regulator, using test instruments to obtain recommended CO_2 and draft without smoke.

Refer to page 9. All service to the oil burner, oil filter, oil strainer, etc. should be performed by a professionally trained service person

IV. GENERAL MAINTENANCE

These operations are recommended to be performed at regular inter vals:

A. CLEAN BOILER HEATING SURFACES THOROUGHLY, DOWN TO CLEAN METAL.

1. To clean the fireside boiler surfaces, first shut down burner by dis connecting all electrical power to the burner by turning OFF the OIL BURNER EMERGENCY SWITCH.
2. Remove the flue pipe from the boiler flue collar and clean thorough ly.
3. Inspect the entire vent connector back to the chimney and clean if necessary.
4. Inspect the chimney for soot, debris and other unsafe conditions of the chimney and take the necessary action.
5. Remove the flue collector by first removing the top jacket panel. The flue collector is held in place by two hex 1/4 20 screws. Remove the screws and carefully remove the flue collector. Try not to disturb the flat fiberglass rope under the flue collector.
6. When necessary to clean the combustion chamber you must first CLOSE the suction valve (and return valve if two pipe). Then discon nect the oil lines from the burner. The flexible electric conduit con nected from the junction box on the boiler to the burner via a plastic connector must be disconnected from the burner by grasping the plastic half of the connector closest to the flexible conduit and gen tly pulling it in the direction of the conduit until it is disconnected. Remove the single 3/8 16 hex head screw on the LEFT side of the swinging door. You will need a 14 mm (9/16") drive socket. Open the door to completely expose the combustion chamber for thor ough cleaning and for inspection of target wall, blanket (provided in certain models; see rating plate), main cast iron burner door insula tion and burner door fiberglass sealing rope. If combustion chamber parts above are badly deteriorated then replace with original factory parts available at your distributor.
7. Use the flue brush to clean the pinned flueways between the sec tions.† A wire brush may be used to remove any carbon accumu lation that may have developed in the combustion chamber. Vacuum the loose soot and debris from the boiler.

B. BOILER CONTROLS: check contacts, settings, correct functioning.

C. PIPING: check piping and accessories for leaks.

D. CHIMNEY or STUB VENT and Breeching: check for obstructions, corrosion and leaks.

E. COMBUSTION AIR TO BURNER: check for continued POSITIVE supply of air as required. Air needs are greatest in coldest weather. Refer to AIR SUPPLY, pages 4&5.

F. WATER SYSTEM: check

1. System to be full of water and pressure to remain stable (between 83 kPa and 173 kPa [12 psi and 25 psi]).
2. Air control system: noise and air binding in radiation should not occur.
3. Water lines: slightest leaks should be corrected.
4. Low water cut off, for operation (see instructions furnished with unit). See page 11.

G. STEAM SYSTEM: check

1. Low water cut off, for operation (see instructions furnished with unit). See page 11.
2. Check pressure cut off for operation. See page 11.
3. Any unusual water conditions. Obtain water analysis and treat water.

H. BOILER ROOM AIR SUPPLY: supply air openings should be open and free of obstruction. See pages 4&5.

† A flue brush (57 mm [2 1/4"] dia.) is supplied with boiler. Replacements are available from dealer or hardware stores.

APPENDIX A

Prevention or Reduction of Condensation in Flue Passages

It is strongly recommended to prevent or reduce condensation in the flue passages for fossil fuel cast-iron boilers.

This can be accomplished by:

- the use of a manual bypass between the boilers
- the use of Primary/Secondary piping
- the use of other effective arrangments or devices

APPENDIX B

THERMOSTAT HEAT ANTICIPATOR SETTINGS

Fixed anticipator thermostats are not adjustable.

Adjustable anticipator thermostats, depending on thermostat model, may be adjustable from a .18 to a .9 setting by moving a pointer on the anticipator.

The higher the anticipator setting (towards .9) the longer it will take for the thermostat to respond to a change in room temperature. Too high a setting and the boiler will be slow to respond to a temperature change in the room. This can cause the room temperature to drop to an uncomfortable level before the boiler starts. This may generate homeowner complaints.

The lower the anticipator setting (toward .18) the faster the thermostat will respond to a change in room temperature. Too low a setting and the boiler will short cycle. Boiler short cycling will cause unnecessary wear on the equipment and in the case of oil boilers it can lead to poor combustion and more frequent cleaning of the combustion area.

It is important to understand what the thermostat is controlling and then determine the amp rating of that relay, gas valve, zone valve or control. This information is usually stamped somewhere on the component. A properly set anticipator will allow the system to operate at its maximum effectiveness.

APPENDIX C

WATER QUALITY

Recent investigations of boilers which were installed in hard water areas, revealed that mineral deposits had accumulated at the bottom of the heat exchanger. In addition, sludge, scale and other solid contaminants were present in boilers installed in older systems or where the water was supplied from a well. This accumulation observed to be 64 mm (2-1/2") or more creates an insulating layer that drastically affects boiler efficiency by reducing the transmission of heat through this primary transfer surface and causes extreme metal temperatures that eventually crack the heat exchanger.

Note: DOMESTIC TANKLESS HOT WATER COILS ARE HIGHLY SUSCEPTIBLE TO THIS CONTAMINATION

THE TERMS OF THE BOILER WARRANTY WILL NOT APPLY TO FAILURES ENCOUNTERED UNDER THESE CIRCUMSTANCES.

RECOMMENDATIONS:

On all installations in hard water areas:

1. The system should be thoroughly inspected for leaks which must be repaired however minor they may be.
2. The initial water charge of the system must be treated to reduce its hardness to an acceptable level.
3. Where a continuous fresh supply of hard water is fed to the system as with process or steam boilers, it is essential that:
   a) The feed water is treated to reduce the level of hardness to a point where no significant deposition occurs in the boiler.
   OR
   b) The treated boiler water circulates through a closed circuit heat exchanger which in turn will heat the distribution system water.

   In addition to the aforementioned, older systems and those supplied from wells may require that a filter or strainer be incorporated in the circuit at some point on the return line closest to the boiler. Suitable water treatment filters are commercially available for this purpose.

WE STRONGLY RECOMMEND THAT YOU CONVEY THIS VITAL INFORMATION TO ALL PARTIES CONCERNED.

APPENDIX D

USE OF NON-OXYGEN DIFFUSION BARRIER UNDERFLOOR TUBING

The boiler warranty does not cover leaks resulting from corrosion caused by the use of underfloor plastic tubing without an oxygen diffusion barrier. Systems must have the non-oxygen diffusion barrier tubing separated from the boiler with a heat exchanger, Slant/Fin recommends the use of underfloor plastic tubing with an oxygen diffusion barrier. Other system components may also require protection from oxygen permeation.